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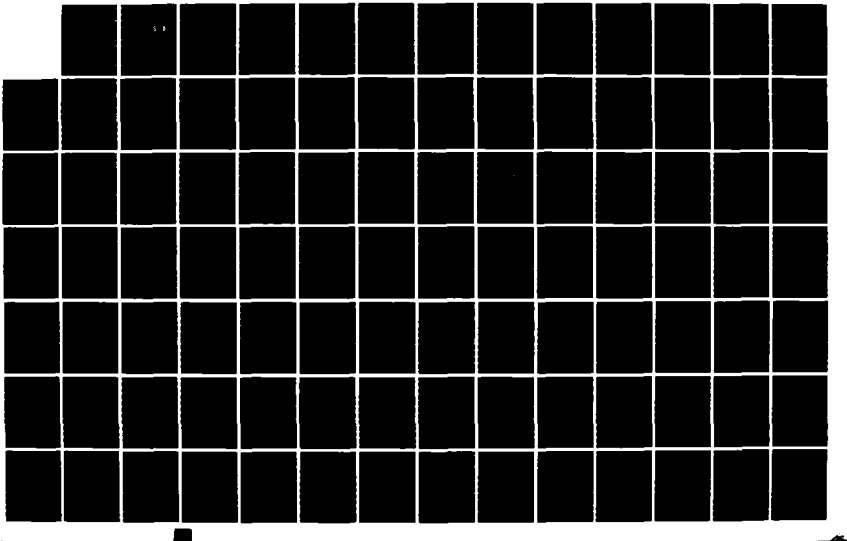

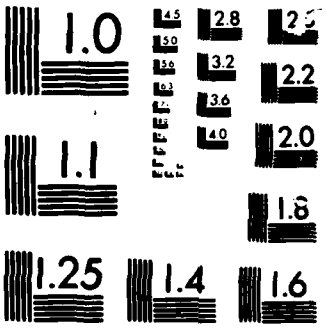

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PROFITABILITY ANALYSIS WITH FTC LINE OF BUSINESS AND CENSUS ESTABLISHMENT DATA: AN EVALUATION OF DATA BASES

THESIS

Gregory P. Miles
Captain USAF
AFIT/GOR/OS/85D-14

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Abstract

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A variation of the generalized F test with interaction terms was used to compare model formulations which differed only in the source of the data for one or more of the independent variables. The comparisons indicated there may be few differences between the data supplied in the FTC and Census data bases. However, comparisons of the coefficients between regression runs with Census data and regression runs with some FTC data indicate economic interpretation of the results could be ambiguous. Specifically, the Capital-Output variable computed from the FTC data was very seldom significant and often times possessed the wrong sign. The use of an FTC Price-Cost-Margin caused a similar problem with the Capital-Output ratio computed from all Census data.

The results of the aforementioned F test comparisons suggested that pooling of the data was possible. Doing so resulted in very robust coefficients for the regressions using a Census derived Price-Cost-Margin but not for those using an FTC derived Price-Cost-Margin. The fit of the model to the data in these regressions as expressed in terms of the adjusted R square was as high as 0.43 when using a Cost Advantage efficiency variable in the model.

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PROFITABILITY ANALYSIS WITH FTC LINE OF BUSINESS AND CENSUS ESTABLISHMENT DATA: AN EVALUATION OF DATA BASES

THESIS

Presented to the Faculty of the School of Engineering
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Operations Research

Gregory P. Miles, B.S.
Captain, USAF

December 1985

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Gregory P. Miles

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PROFITABILITY ANALYSIS WITH FTC LINE OF BUSINESS AND CENSUS ESTABLISHMENT DATA: AN EVALUATION OF DATA BASES

I. Overview

Research Problem

General Issue/Background.

The Need for Data.

The industrial organization economist concentrates much of his thinking and research in three basic areas: the structure, behavior, and performance of markets (32:3). Statistical analysis is the basic tool the economist uses to further his understanding of these areas. But the quality of a statistical analysis is ultimately contingent upon the quality of the data upon which it is based. This thesis will look at a new set of Line of Business data which has only recently been made available to the Public by the Federal Trade Commission (FTC).

The collection of this data, as first proposed in 1970, was in response to a growing concern that as United States (U.S.) corporations became more diversified, the ability to capture and analyze the structure, behavior, and performance of many markets

was becoming suspect (28:270). This situation creates a great problem for those governmental organizations, specifically the FTC and the Department of Justice's Antitrust Division (32:423), whose purpose is to encourage competition in the economy through the enforcement of the Sherman Act of 1890, the Clayton Act of 1914, and others (32:421).

Most of the groundwork for the data collection effort was accomplished in 1973. The General Accounting Office (GAO) received the FTC proposal in March of 1973. The GAO's task was to ensure that the data the FTC was seeking was not already available through other sources, (e.g. the Internal Revenue Service or the Bureau of the Census), and that the proposed collection "imposed the minimum burden" (16:2) on the participants consistent with the needs of the FTC. The GAO approved the FTC plan in May of 1973. The first set of forms to be filed by the individual businesses, covering their 1973 business activity, were sent out soon after (17:1-2).

Legal Challenges.

The program was not well received by the business community. Of the 345 corporations to which the forms were sent, 120 of them refused to comply. The FTC took legal action to enforce compliance. In the meantime the FTC began preparation of the 1974 report form. Many suggestions made by corporations participating in the 1973 survey were incorporated in the new format. Additional changes were made as the result of lessons learned by the commission itself. The new program was approved by the GAO in August of 1975. This time the response of 440 companies was solicited but 170 of them

time the response of 440 companies was solicited but 170 of them refused to comply. The FTC dropped its legal actions against the 1973 noncompliants in April of 1984 in order to concentrate on the 1974 group (17:3) given the richer content of that years survey.

Many of the noncompliant companies filed a suit against the FTC in 1976 to seek the curtailment of the data collection. The principle arguments of these companies against the FTC consisted of the following (16:367-372):

1. There was little evidence to support the FTC's contention that there was a definable relationship between the structure of an industry and the tendency for the leading firms of the industry to raise prices above cost through either tacit or expressed collusion.
2. Line of Business categories did not describe economically meaningful markets (see Shepherd [29:175] for a discussion of economic markets) which could be used in ascertaining the infringement of antitrust laws.
3. Because different companies used different accounting methods, meaningful comparisons could not be made.
4. Accounting data is insufficient by itself to allow for "meaningful economic analysis and inference" (16:372).

5. Contamination of "Sales" data (i.e, all revenues accruing to the activities of a particular line of business within a company [14:257]) by revenues actually belonging to another line of business would be as high as between 33% and 60% of the total reported.
6. The burden of cost for data collection to be borne by the participating corporations would be excessive.

All of these issues were addressed in a Bureau of Economics Staff Memorandum (16:358). While the Bureau agreed to the possibility of the first assertion, it stated the determination of nonexistence of such relationships would in itself prove useful. To the second charge, the Bureau responded that even though "many of the industry categories are broader than might be adopted in a specific antitrust case" (16:368) the LOB data could aid in the search for potential violators of the Sherman Act.

The bureau's response to the third charge was that even though different accounting procedures would be used, the systematic or unsystematic (random) proliferation of accounting procedures could be accounted for statistically. Random errors would tend to cancel each other out by the law of large numbers (see Mendenhall [18:277] for an indepth discussion of this property). Systematic differences could be detected and accounted for by using the techniques of statistical analysis (16:370).

The bureau addressed the fourth charge by citing the obvious fact that it is accounting data upon which much of the decision making by management in corporations is based. Analysis of this data could possibly help to reveal the impact of industry structure on the decision making process.

The issue of sales contamination, though not addressed until after the data was collected, was settled when analysis revealed an average sales contamination of less than 5.7 percent (16:370).

The FTC addressed the question of cost burden by recognizing that the cost of compliance would "rise more than linearly with greater diversity due to increased complexity and decentralization of record-keeping in larger companies" (16:366). This seems to have been borne out by the cost figures issued by the Du Pont company which had 21 LOBs. Their estimate, the highest in the study, was that between 1.2 and 1.8 million dollars would be required the first year, with annual expenses running several hundreds of thousands of dollars (16:364). By comparison, the average cost for all reporting companies was about 24,000 dollars.

To help lessen the costs of reporting, the FTC allowed companies a great deal of latitude in identifying their lines of business, shifting the emphasis of the reporting from an establishment orientation to one of product lines (5:119). A given company could combine "establishments, product centers, or other organizational units" (16:348) in a manner consistent with providing the most detailed information at the lowest cost.

Given these arguments and explanations, the court decided in favor of the FTC in 1978 (14:38). As a result, 1974 Line of Business data was submitted by all of the plaintiffs by December of 1978 (14:38).

Data Collected.

Data was collected on individual Lines of Business (LOBs) associated with a given company as mentioned above.

For 1973, the FTC established coded LOB categories in accordance with 3 digit standard industrial classification (SIC) codes as used in the Census of Manufacturers. When filling out an LOB report for a specific LOB code, a company had to ensure that at least 85% of the activity it was describing could in fact be attributed to that FTC code (16:305). If this criteria could not be achieved then further segmentation of the activity into additional LOBs would have to take place.

SIC codes first appeared in 1939 and are today maintained by the Bureau of the Budget (22:119). The codes representing the manufacturing sector of the economy were based on a system already in use by the Census Bureau. However, revisions to many of the codes in the years 1957 and 1972 each rendered comparisons to the data in prior Census years virtually impossible (6:X). The current system divides the US economy into 99 Major groups. Each major group is represented by a two digit code. For example, code 20 encompasses all Food and kindred products while code 75 encompasses automotive repair, services, and garages. Three digit

codes identify industry groupings which are roughly similar to IRS "minor" industries (29:49) while four digit codes identify individual industries (22:116). The Census Bureau has added additional digits to the code corresponding to additional degrees of refinement of the data. For example, the Census Bureau has established approximately 13,000 seven digit codes which each identify an individual product. Each series of codes can be used in different types of investigations. Shepherd, for example, argues that the Census five digit codes which correspond to product classes come closest to fitting the average scope of markets (32:199).

By 1974, the commission had segmented many of 1973's LOBs into smaller LOBs corresponding to 4 digit and even in some cases 5 digit SIC code equivalents. This resulted in 275 LOBs of which 144 closely approximated a single four-digit SIC code.

The FTC sought data which would provide adequate coverage for most Census industrial categories (27:24). Adequate coverage was attained by adherence to the following criteria (16:340-341):

1. All corporations which primarily engaged in manufacturing and which possessed at least one billion dollars in assets would be included.
2. The top 250 Fortune 500 companies including those described by (2) above would be included.
3. At least five companies had to report in each category.

4. At least 20% of total national sales for each category had to be represented by the sample.

The FTC geared its information gathering to address several basic relationships of interest to students of industrial organization. For example, market conduct and strategy can be inferred from Media Advertising expenditures (25:26) and from other selling expenses which have traditionally never been reported. The dynamism of the economy can be anticipated by moneys spent on research and development. Measures of capital intensity (26:54) and cash flows (26:59) can be inferred from asset data and depreciation allowances respectively. And finally the impact of differing reported accounting practices on performance measures can be assessed (16:338).

Ravenscraft said the following of the results of the FTC effort:

> When combined with Census and input-output data, the FTC line of business data allow the estimation of a structure-performance equation of unprecedented richness (27:22).

The improvement over previously available Census data is thought to be twofold. First, because the level of aggregation is at the LOB level, the shortcomings of second product contamination which is inherent in the Census's primary industry data can be greatly reduced. Second, a few types of information are not gathered by the Census or at least not at the level of detail available in the FTC data. One such item is the selling expenses incurred by a firm which are not related to advertising (14:272). The upkeep of a

salesforce would be one such expense. It has been argued that these "Other Selling Expenses" may be as great in magnitude for some companies as "Media Advertising Expenses" (16:338).

Why Aggregated Data?

FTC confidentiality rules specify "no data may be published that would result in the disclosure of individual company data" (14:40). Hence aggregated data for individual lines of business was published only if four or more firms in that line were included in the survey.

The FTC believes the aggregated data will provide some benefit to the public. They cite the following possible uses:

1. Any company in a particular line of business will have some measure by which it can evaluate its performance as compared to other companies.
2. Competitive market entry may be encouraged for high profit industries.
3. Better investment decisions will be made.
4. "Like economists within the FTC, outside scholars will use the LOB reports as a basic source for advancing the frontiers of industrial organization knowledge (16:339)."

These benefits rest on the presumption that the aggregate FTC LOB data refines and/or extends the census industry data in some useful ways. It is this presumption which will be examined in this thesis.

Specific Problem.

The census 4-digit SIC industry data has been used extensively to examine the relationship between net profitability and industry concentration (28:270-272). This data is gathered on an establishment (plant) basis and aggregated into the 4-digit SIC "industries". Some of these "industries", as noted above, may depart significantly from true economic markets (see Shepherd [29:175] for a discussion of economic markets). The FTC categories are comprised of data aggregated from LOB definitions which are thought to be an improvement over the Census definitions (27:22). This may seem surprising since 44% of the FTC categories correspond more closely to 3-digit SIC codes which are more aggregated than the 4-digit codes which the Census uses in compiling its industry statistics. Some economic markets may best be captured by the three digit codes however. This thesis will analyze the Census "industry" data and the FTC LOB aggregated data to determine the extent to which the latter differs and/or improves upon the former for purposes of studying the question of how market structure relates to industry profitability. This question has been explored extensively by industrial organization economists over the last thirty years and the need to gain further insights into this relationship was a major factor in the FTC's data initiative.

Research Question.

How does the FTC data extend and/or improve upon the

statistical and/or economic results obtained with the structure-profit model using census industry data alone?

Subsidiary Questions.

1. What factors are available in each data base?
2. How comparable are similarly defined factors in the two data bases?
3. How robust, both economically and statistically, is the basic structural model in each data base?
4. How effectively does the FTC data base allow one to extend the basic structural model?

Research Method

Overview of Method.

Specific items of information from both the FTC and Census data bases were entered into separate files on the UNIX VAX computer. The FTC data base was actually composed of two distinct data sets containing information for the years 1975 and 1976 respectively. Two other years worth of FTC data (1973 and 1974) exist but were not used since they represented a period of time when government imposed wage and price controls were in effect (1). A single set of data was constructed using primarily Annual Survey of Manufacturers (ASM) data. Additional data items were drawn from the 1972 and 1977 Censuses of Manufacturers and the 1977 Input-Output Tables either because some data was contained in the

LOB data base but not available in the ASM data or was not contained in the LOB or ASM data but which would allow further expansion of the basic model.

A pairwise correlation matrix was created to ascertain the degree to which similarly defined data from each of the two data bases were comparable. Other variable pairs showing a strong correlation with one another were studied to ensure the relationships could be explained economically.

The following profit-structure model was taken from Allen (2:934) and served as a standard against which the models developed for this research effort and the results of this thesis were compared:

$$PCM = f\ (C4,NCO,KO,DISP,CDUM,GROW)$$

where:

C4 is the four firm concentration ratio and is measured as the market share of the four largest firms in any one industry (32:188),

KO is the capital-output ratio and is defined as "the gross book value of fixed assets divided by the value of shipments" (2:934),

NCO is the number of companies represented in each Census industry category for 1977,

DISP is a measure of the tendency for a particular industry to be concentrated in a relatively small geographic region of the country (11:286). It is calculated as follows:

$$Disp = \sum_{i=1}^{m}\sum_{j=1}^{n} \left| \frac{VAdd_{ij}}{VAdd_i} - \frac{VAdd_i}{VAdd} \right|$$

where:

"i" represents the region number,

"j" represents an industry identifier,

"m" is the total number of industries, and

"n" is the total number of regions.

Since VAdd by region does not appear in the 1977 Census (6:XV), this information is extracted from the 1972 Census.

CDUM is a dummy variable which is used to account for possible differences in total advertising expenditures between the consumer and producer goods markets (25:44). "It is equal to one for consumer goods industries and zero for producer goods industries" (2:934).

GROW is an indicator of the change in size of a particular industry over the period between the Census years, 1972 and 1977. It is calculated according to the following equation:

$$GROW_j = \frac{VShip_{j,1977} - VShip_{j,1972}}{VShip_{j,1972}}$$

and the Price Cost Margin (PCM) as explained by Shepherd (32:269) is defined as:

$$\text{Price-cost margin} = \frac{\text{Value-added - Payroll}}{\text{Value of shipments}}$$

Value of shipments (VShip) is essentially what an industry receives in payment for all products shipped in a given year. This includes the value of materials which were transferred between companies in a single organization (6:A-2). Value added (VAdd) as explained by Shepherd (32:269) is contained in the Census data. It can be derived from the FTC data as follows:

$$\text{VAdd} = \text{VShip} - \text{Cost of Materials} + (\text{End of Year Inventory} - \text{Beginning of Year Inventory})$$

The Biomedical Data Programs (BMDP) were used to estimate least squares regressions of the basic model expressed in a linear form using the two data bases (13:237). Comparisons were made of the resulting adjusted R squared ($\bar{R}^2$) values (23:424); the F test for a regression relation (23:240), and the t test for testing the significance of individual variables (23:243).

The basic model was extended to allow for the addition of several other variables which are available from the Census and FTC LOB data bases.

II. Literature Review

Introduction

As indicated in the previous chapter, this thesis will concentrate on the profitability model. The pioneering efforts in the use of this model can be traced back to Joe Bain's 1951 effort which considered the relationship between rate of return on equity after tax (34:196) and the eight firm concentration ratio. Bain's work indicated that increased concentration does increase profitability for leading firms in a given industry. Many studies have followed, but not all have shown this relationship to be a strong one. (34:196-209).

The issue which has developed since Bain published his paper concerns his interpretation of the concentration coefficient. There are those like Bain who believe the more concentrated are the leading firms in an industry, the more likely those firms are to collude either tacitly or implicitly to control prices. On the other hand, there are those who believe higher profitability accrues to larger firms because of increased efficiency (12:1).

The proponents of efficiency argue that the anti-trust legislation, which is designed to prevent resource misallocation, as currently written does more harm than good when it leads to the breaking up of large efficient firms just because they hold a dominant position in their market (18:83). Harold Demsetz, a leading proponent of this viewpoint, believes Market Share is a stronger indicator of profitability than is concentration (12:1). The greater the Market

share of the firm, the greater is the economy of scales which are possible. This in turn, reduces cost and increases profits (18:83). Demsetz has offered evidence which indicates that concentration is positively related to profits for only the largest firms of an industry, but that similar levels of concentration in firms of smaller size indicate no increases in profitability (2:933). This analysis would tend to support Market Share as the primary relationship. Gale and Branch (18) used a supposedly more accurate set of data collected over several years by the Strategic Planning Institute (30:109) and arrived at the same conclusion. Unfortunately this data, like the individual firm FTC data, is not available for public scrutiny, which leads to the point of this thesis. Given the independent researcher has no access to much of the supposedly better data sets, is it still possible to do meaningful work with the data that is available?

The remainder of this chapter is divided into two sections. The first section will concentrate on studies of the profit-structure relationship which used predominantly Census data. The second section will consider some of the results offered by researchers who had access to either the confidential PIMs or FTC data bases. The emphasis in both sections will be on data bases. Specific questions considered include:

1. What available data was used?
2. What was the period covered by the data?
3. What was the motivation for including a specific data item in the first place?

4. What variables shed additional light on the profit-structure relationship?

The chapter will begin with the work of Bain who used predominantly Census data in his studies, and will end with the work of Ravenscraft who was among the first researchers to add FTC data to the profitability model. The reader should keep in mind that not all the variables discussed were included in the data base used in this thesis since many of them were created from information not available to the public.

Census Data Studies

Researchers, beginning with Bain, have relied heavily upon Census data for their studies. This is because the Census data is the most comprehensive source of concentration values which is publicly available. The need for this information is made evident by Bain's major hypothesis (3:294):

> the average profit rate of firms in oligopolistic industries of a high concentration will tend to be significantly larger than that of firms in less concentrated oligopolies or in industries of atomistic structure.

Bain drew his concentration data from the 1935 Census of Manufacturers (3:298). This Census reported on 340 manufacturing industries in all. His profit data was derived from Security and Exchange Commission (SEC) publications, covering the years 1936 to 1940 (3:303).

The SEC publications provided data on only 152 Census industries which meant the remaining 188 industries were eliminated. Three of the remaining industries lacked the necessary concentration data and so they were also eliminated leaving 149. In 34 cases, the SEC profit data represented three or fewer firms in the industry and hence did not cover a large enough proportion of industry output to be kept in the study. Six more industries were eliminated because their Census concentrations did not correspond closely enough to data available from another source (3:304). These actions left 109 industries for further consideration.

Unfortunately, Census industries do not always correspond to true economic markets. In such a market, it is assumed that all included goods are substitutable for one another and hence compete directly with each other for sales. Examples include Cane and Beet sugar; margarine and butter; cassette, 8-track, and open reel tape recorders among others. Definitional problems and the fact that Census data represents the sum of national sales for each industry often causes the data to fail to represent true markets on at least three counts (3:299):

1. Census industries may contain products which though similar in material content are not truly substitutable for one another. An example of such products include armor plate, ball bearings, and construction I beams which are all produced by the

steel industry but which obviously have totally diverse and noncompatible uses.

2. At the other extreme, Census industries may be too narrow in scope, not including all products which may be close substitutes for one another. Canned Fruits and Vegetables (SIC 2033) and Frozen Fruits and Vegetables (SIC 2037) are but one example of this problem The Census, under such circumstances, would overstate the concentration of these industries. A similar effect can be observed when a large quantity of imports forms a substantial segment of overall sales in a particular market. But these imports are not recorded in the Census. Therefore, the Census concentration ratio will again overstate concentration in the industry for failing to consider all competitors. Bain rejected 3 industries because they were too segmented and 1 industry because it failed to consider imports.

3. Finally, because of the national perspective of the Census industry data, local market influences are not drawn out. The baking of bread, for example, is conducted on a local enterprise basis given the time constraint of freshness and transportation costs. Total production costs will differ between regions based upon the costs of flour and labor. Unions will

> be strong in some areas, flour may be more or less costly amongst other things. This local effect will generally be misrepresented in the national figures by concentration ratios lower than would be revealed by individual local market concentration indices (11:273). Using the geographical market segmentations outlined in the publication, Structure of the American Economy (3:303), Bain reduced the number of industries by 66, all of which he found susceptible to regional effects. Later investigation (3:304) revealed some of the publication's information was in error which resulted in three of the previously rejected industries being added back to the list.

Bain was left with 42 industries after performing the elimination process described above.

Bain established a profitability measure for testing his hypothesis as follows (3:310):

$$\text{Profit} = \frac{\text{Annual net profit after income taxes}}{\text{Net worth at beginning of year}} \qquad (2.1)$$

This was the profit for each firm. He calculated this value for each firm for each of the five years covering the period 1936 to 1940, inclusive. He then calculated an industry average profit rate for

each of these five years as follows:

$$\text{Industry average profit rate} = \frac{\frac{\Sigma \text{ firm profits}}{\Sigma \text{ firm net worths}}}{\text{Number of firms in Industry}} \quad (2.2)$$

Bain chose the eight firm concentration (C_8) measure (3:311) for his calculations. This lead to the following basic model:

$$\text{Industry average profit rate} = \beta_0 + \beta_1 C_8 \quad (2.3)$$

Considering only the firms with net worths of 5 million or more dollars, Bain found that a significant increase in profitability existed for firms which were part of industries with C_8 above 70 percent (see Table 2.1). Bain also divided the firms into different size classes (3:322). He was not able to find any relationship between firm size and profitability. He also reported no significant correlations between profitability and the "ratio of capital to total assets, the ratio of overhead to total costs, the ratio of net worth to sales," and a measure of the number of consumers as opposed to producers who would be purchasing the product (3:323).

Bain's results supported his hypothesis but he cautioned that studies would have to be conducted for periods outside of the 1936 to 1940 time frame to see how robust these findings really were. Many

Table 2.1

Profitability - Concentration Categories

Concentration Range (Per Cent of Value Product Supplied by Eight Firms)	Number of Industries	Average of Industry Average Profit Rates[1]
90-100	8	12.7
80- 89.9	11	10.5
70- 79.9	3	16.3
60- 69.9	5	5.8
50- 59.9	4	5.8
40- 49.9	2	3.8
30- 39.9	5	6.3
20- 29.9	2	10.1
10- 19.9	1	17.0
0- 9.9	1	9.1

[1] Average of net profits after income taxes as percentages of net worth.

Source: Adapted from Joe Bain, "Relationship of Profit Rate to Industry Concentration, American Manufacturing, 1936-1940," Quarterly Journal of Economics, 65 (3): 313 (August 1951).

such works did follow including another one by Bain (3:2). Perhaps the most intensive study was that of Collins and Preston in 1968 (11).

Collins and Preston concentrated on data contained in the 1963 Census (11:274). Like Bain, they viewed any positive relationship between profitability and concentration as an indication of collusion amongst the leading firms.

These authors attempted to use control variables to adjust for the deficiencies of the data rather than eliminate observations as Bain had done. They also grouped industries according to three characteristics, type of purchaser, product differentiation, and increasing or decreasing levels of concentration. Each of the total 417 4-digit industries were classified as either consumer or producer oriented according to an unpublished 1963 FTC classification guide (11:278). From this process, 141 industries were found to belong to the former group and 276 belonged to the latter. A similar process was undertaken to divide the identified consumer goods industries into those which actively pursued product differentiation and those which did less so. Product differentiation is normally attained via advertising and is viewed by some as a barrier to market entry (25:6). Division was again accomplished using an unpublished FTC document. The FTC apparently made its determinations based on the advertising expenditure to sales ratio for the industry. Generally industries classified as undifferentiated showed ratios of less than 1 percent, those moderately differentiated between 1 and 10 percent, and those highly differentiated over 10 percent. Of the industries

considered, 93 were classified as highly or moderately differentiated. The final groupings involved the division of both the producer and consumer groups into those industries whose concentration ratio increased since the previous Census year, 1958, those whose concentration decreased, and those whose concentration remained relatively stable.

Having grouped their data, Collins and Preston then performed the following regression on each of these subgroupings as well as all 417 industries:

$$PCM = \beta_0 + \beta_1 C_4 + \beta_2 Disp + \beta_3 KO. \qquad (2.4)$$

C_4, Disp, and KO are as defined in Chapter 1. Disp is used to help control for geographic influences on concentration. The capital intensity measure, KO, controls for the "inter-industry differences in capital intensity, and hence in implicit capital costs" (19:102) which are not incorporated in the price cost margin. Under competitive conditions, "margins over variable costs should be higher in industries" for which KO is large since management must attempt to recover the cost of capital investment in the long run (11:272).

Collins and Preston use the Price-Cost margin also defined in Chapter 1. They feel this measure is appropriate because the rate of return on assets used by Bain and others cannot be directly computed using Census data and the "relationship between prices

and costs, and with the discrepancy between them that gives rise to profits" (11:272) is not as visible.

Like Bain, the authors feel their analysis generally supports their theory. Their results are contained in Table 2.2. The coefficient of the concentration ratio was significant in all their regressions. Generally concentration had a greater bearing on consumer industry profits, differentiation had little bearing at all, and consumer industry profits were favored in industries where concentration remained stable between Census years. This latter result is not unexpected given that changes in concentration for an industry indicate that the industry is undergoing a period of disequilibrium. During such times many forces could act to dilute any profit-concentration relationship (11:279). Such forces could include price-cutting by an established firm in the face of new competition or shifts in consumer tastes among other things.

The authors made further investigations to see if the positive concentration-profit association resulted mostly from a relationship between the concentration ratios and profit margins of the largest firms in an industry. They made further regressions of the same model used before, but this time used Census data which considered the top four firms in an industry. This type of data was unavailable for 11 of the previously considered 417 industries. This time, the results were not so pronounced; however, the concentration-profit relationship was again stronger in consumer rather than producer goods industries.

Table 2.2: Regression Coefficents of Independent Variables

Industry Group, Number of Industries, and Degree of Differentiation	Concentration	Geographic Dispersion	Capital-Output Ratio	Constant Term	R^2
All Industries (417)	.121[a]	.****	.****	20.25	.10
	.096[a]	-.029[b]	.092[a]	19.54	.19
Producer Goods Industries (276)	.068[a]	.****	.****	21.90	.04
	.033[c]	-.035[a]	.133[a]	19.48	.26
Consumer Goods Industries (141)	.224[a]	.****	.****	17.25	.26
	.199[a]	-.022	.103	17.36	.28
High-Moderate Differentiation (93)	.197[a]	.****	.****	19.31	.19
	.189[a]	-.027	.053	20.05	.21
Low Differentiation (48)	.214[a]	.****	.****	15.78	.21
	.150[b]	-.005	.165[b]	14.69	.32

[a] Significant at one per cent level. [b] Significant at five per cent level. [c] Significant at 10 per cent level.

	Averages	
	Margin	Concentration
All Industries	24.92	38.48
Producer Industries	24.57	39.09
Consumer Industries	25.61	37.28
High-Moderate Differentiation	27.88	43.43
Low Differentiation	21.21	25.35

Source: Adapted from Norman Collins and Lee Preston, "Price-Cost Margins and Industry Structure," Review of Economics and Statistics, 51 (3): 277 (August 1969).

Leonard W. Weiss wrote a paper (34) in 1974 which summarized the research on the concentration-profit relationship up to that time, including the two papers already discussed. He also extended some of the work of Collins and Preston.

Weiss corrected for what he thought were the major defects of the Collins and Preston studies (34:227). Though he developed several variables, the following model includes his most significant:

$$PCM = \beta_0 + \beta_1 C_4 + \beta_2 Disp + \beta_3 KO + \beta_4 A/S + \beta_5 COE \qquad (2.5)$$

where:

A/S was an advertising to sale ratio calculated from data contained in 1963 Input-Output Tables. This data was available for only 227 of Collins and Preston's original set of 406 industries because not all input-output categories corresponded to Census 4-digit industries,

Disp and KO are defined in Chapter 1, and

COE represents central office employment divided by total employment.

Weiss used the same 1963 Census data set which Collins and Preston used for his calculations of the dependent and independent variables (34:227).

Weiss found the addition of the A/S and COE variables did not significantly affect the results of Collins and Preston. Weiss, like Bain, then added several more variables. These included the ratio of

the output of the mid size plant in an industry to that industry's total sales and a measure of industry growth, and a ratio of consumer demand to total demand multiplied by the concentration ratio. (34:229). Like Bain, Weiss found none of these variables to have a significant impact in the model. Some of these variables will be discussed later in this thesis. One is worth discussing at this point.

The consumer demand variable was an attempt to capture the percentage of total shipments which were destined for consumers. To Weiss, this represented an improvement over the division of industries into consumer and producer groups accomplished by Collins and Preston. The argument seems reasonable given that many industries (e.g., chemicals and electronic components) engage in both consumer and producer shipments. The data for this calculation was obtained from the 1963 Input-Output Tables.

Caves, Shirazi, and Porter (10) addressed the hypothesis that scale economies can be used to erect barriers to entry. These barriers are created in a particular market if the minimum plant size which will insure efficiency and hence competitiveness in production is quite large. The firms already in such an industry can collude together and raise their prices above the competitive rate as long as they do not exceed the threshold which would attract new entrants in spite of the large entry expense. The authors use 1965 and 1958 Census data combined with IRS minor industry data. Their profitability measure was similar to that used by Bain:

$$\frac{\text{Gross income - taxes}}{\text{Stockholders equity}} =$$

$$C_8 + A/S + GR + KR + REG + AI + GR*C_8 + MESCA \qquad (2.6)$$

A/S is the industries advertising to sales ratio for firms with assets less than 500,000 dollars as averaged over the years 1963 to 1965, inclusive. This information was extracted from IRS data.

GR was the ratio of 1965 industry shipments to 1958 industry shipments as taken from the appropriate Censuses.

KR was the product of the plant minimum efficient scale (MES) for the industry and the industry assets to sales ratio. These authors defined MES as "the average size of the largest plants accounting for 50% of industry output, expressed as a percentage of industry sales" (10:137). It is assumed this data was derived from the Census. KR is an attempt to measure the capital requirements of a particular industry and hence is similar to the capital-output ratio discussed earlier.

REG was an indicator variable which attempted to control for the regional market effects on concentration discussed earlier. This variable was set equal to 1 if the industry was considered regional and to 0 otherwise.

AI was the product of A/S and advertising per firm for the largest firms accounting for at least 30% of industry shipments. No theoretical explanation of this variable was offered nor was it considered in the authors' subsequent analysis.

GR*CR8 was the product of the growth variable and concentration ratio already discussed. Like AI, the authors offer no specific theoretical justification for its inclusion. One possible explanation, offered by Collins and Preston (11:282), says that the concentration of industries will grow over time assuming the largest firms in those industries had margin advantages to begin with.

MESCA was the quotient of MES and the cost disadvantage ratio (CDR). CDR was defined to be the "average value-added per worker in plants supplying approximately the bottom 50% of industry value-added divided by average value-added per worker in plants supplying the top 50%" (10:135). This interaction term reflected the possibility that even with modest cost disadvantages some potential competitors may decide to enter the market anyway because the entry barriers are actually lower than implied by the minimum efficient scales measure alone (19:102). The ratio was found to vary between less than unity and slightly above unity for the industries considered. The authors constrained the values above unity to be equal to one since their interest was in industries for which this value would be considerably less than unity. A variety of similar variables were constructed by taking the product of MES and a dummy variable. For example, the dummy variable in MESD10 was set equal to one if the value of CDR was less than 1 and to 0 otherwise. Similarly MESD15 included a dummy variable set equal to 1 if CDR was less than .85.

Running their basic regression, but taking into account different MESD variables, the authors concluded that entry barriers are created only when the CDR is large, in the neighborhood of between 10 and 20 percent. Table 2.3 lists several of their results. Note the entry barrier variable was significant for all four regressions.

In 1979, John Kwoka submitted a paper to the economic community (19) which suggested the four-firm concentration ratio was too broad in scope to detect the existence of collusion on the part of the leading firms. He based this assertion on studies he was able to perform using an independent data set which allowed for the determination of market share for each of the largest individual firms in an industry.

Kwoka's model is not unlike the ones previously described in this paper. It essentially summarizes the work in the area by the previous authors.

$$PCM = FSD + KO + DISP + GROW + CDUM + MID + MCDR \quad (2.7)$$

PCM, KO, and DISP are defined as described in chapter 1. GROW, as explained in Chapter 1, represents the percentage change in industry shipments between 1967 and 1972 (19:102). This measure differs from the GR variable used by Caves, Shirazi, and Porter which takes the simple ratio of these two values,

MID (mid-point plant scale) as mentioned previously was used by Weiss. He found it to be of little significance in his study (34:229). Again, MID is defined as the value of shipments produced by a

Table 2.3: Scale-Economy Barrier Regressions

	Intercept	CRS	A/S	AI	GR	GR*CR8	REG	KR	Scale-Economy Barriers	R^2	$\bar{R}^2$
19 Convenience Industries											
1.	-21.7	.924	.634[a]		.0764[a]	-.00120[b]	14.7	.00169[a]	.0168[b]MES	.912	.856
	(0.50)	(1.22)	(6.17)		(2.89)	(2.14)	(1.18)	(2.91)	(1.94)		
2.	-46.5	1.18[c]	.571[a]		.0843[a]	-.00121	16.3[c]	.00212	.0222[a]MESD10	.932	.889
	(1.14)	(1.74)	(5.98)		(3.56)	(1.58)	(1.58)	(4.65)	(2.84)		
23 Nonconvenience Industries											
3.	114[a]	-.199		.00140[a]	-.00534			.000389[c]	-.0301[b]MES	.701	.613
	(4.32)	(0.47)		(4.51)	(0.35)			(1.54)	(1.74)		
4.	134[a]	-1.10[a]		.00012[a]	-.00315			.000827[a]	.0350[a]MESD10	.748	.674
	(5.37)	(3.44)		(4.49)	(0.23)			(3.74)	(2.60)		

Significance levels are: a. 1%, b. 5%, c. 10%.

Source: Adapted from R. E. Caves, Khalizadeh-Shirazi and M. E. Porter, "Scale Economies in Statistical Analyses of Market Power," Review of Economics and Statistics, 57: 183 (May 1975).

fictitious plant located in the center of the plant size distribution for a particular industry (34:230). The size of this plant is estimated from the employment size classes in the Census (19:102). Unfortunately, this variable tends to be highly correlated with the concentration ratio.

Caves, Porter, and Shirazi had broken a similar correlation problem which existed between C4 and MES when they multiplied MES by the Cost Disadvantage Ratio (CDR). Kwoka performed a similar alteration of MID to accomplish the same objective. In addition to a reduction of collinearity in the model, Kwoka also found that the use of MCDR improved the overall fit for the model (19:103).

The variable CDUM attempts to capture the advertising effect discussed earlier. It is set equal to 1 if the industry is consumer oriented and to 0 otherwise. The determinations were based in part on a 1967 article published by the FTC (19:102) which in turn were based on industry advertising to sales ratios. The origin of this data is indeterminate. Kwoka infers that input-output data would have been preferable but was not available for the 1972 Census year at the time this article was published (19:102).

FSD (Firm Size Distribution) refers to the several possible methods employed by the author in capturing industry concentration. These include the standard Census C_4 calculation, the Herfindahl index, and one which the author derived using the Economic Information Systems (EIS) data base.

The Census definition was discussed in Chapter 1. Shepherd believes this is "the best all-purpose measure of the degree of competition" (32:190).

The Herfindahl index is defined as:

$$H = \sum_{i=1}^{n} p_i^2 \qquad (2.8)$$

where

p_i is the market share of the ith firm (26:186).

This tends to give greater weight to the larger firms in an industry (32:189) because of the squaring of the market share. The upper bound of this index is unity and the lower bound is unity divided by the number of firms in the industry (22:125). The lower bound is approached when all the firms in an industry are of approximately equal size. The principle difficulty in the use of this index is the inaccessibility of market share data due to disclosure regulations. These were discussed in Chapter 1.

Kwoka tried to mimic the Census concentration ratio by obtaining market share data from a source other than the Census. This data set was put together by Economic Information Systems, Inc. and contained information on over 120,000 manufacturing establishments in the United States, each with 20 or more employees (19:109). Employment for an individual plant was determined by

reference to a mailing originally sent out to 300,000 establishments. EIS matched this information to the County Business Patterns statistics which contained employment figures by SIC, and then calculated a productivity factor derived from the Census.

$$\text{Productivity} = \frac{\text{VShip (for a specific plant size)}}{\text{Number of employees in such a plant}} \qquad (2.9)$$

EIS then multiplied this factor by the number of employees in each plant. This yielded a value of shipment figure for the plant corresponding to a Census 4-digit industry which was then divided by the total shipments for that industry to arrive at approximate market share. The FTC took the work of EIS and aggregated the plant data into firm data. Kwoka then added the market shares for the four largest firms in the industry to arrive at a proxy for four firm concentration.

The EIS concentration ratio is very comparable to that contained in Census data (19:109). For example, the mean 4-firm concentration ratio for EIS industries was 0.398 compared to 0.409 for the Census. The correlation coefficient between the two sets was 0.922. Unfortunately, these comparisons could not be made for all 417 Census industries. Non-compatibility between industry definitions and the before mentioned failure of some Census industries to capture true economic markets reduced the sample for comparison to 314 industries.

In running his model with the different concentration measures (see Table 2.4), Kwoka found the EIS based concentration measure to be "the more consistent standard against which to judge later results." (19:103). He found the Herfindahl index to give better results in the form of higher R^2 values and larger t-statistics over both the Census ratio and his ratio only when using MID instead of MCDR. But when using MCDR, which always provided better results, his ratio outperformed the Herfindahl index which in turn outperformed the Census ratio.

These findings are important in the development of this thesis because they point out the effect the use of different data can have on only a single variable which in turn can have a large impact on the outcome of an economic investigation. Kwoka builds upon these results by questioning the use of four firms for building the concentration ratio in the first place.

By adding market shares one at a time to the model in lieu of the FSD, Kwoka builds a strong case that really only two firms have a real impact on profitability. This is strongly indicated by the significance of the concentration coefficients of the regressions shown in Table 2.5. The third market share when added has an indeterminate sign which leads Kwoka to believe that if the third firm is very strong in an industry it is more likely to become a rival of the two larger ones rather than to enter any form of price collusion. The fourth share, when added, gives only a very small

Table 2.4: Comparisons of C4, CR4 and H

	FSD Variable	KD	DISP	GROW	CDUM	Scale Variable	Constant	$\bar{R}^2$
1a	0.1074 CR4						.2285	.070
	(4.95)							
1b	0.0376 CR4	0.0825	-0.0426	0.0557	0.0379	0.0669 MID	.2125	.163
	(1.22)	(4.45)	(3.06)	(2.90)	(3.58)	(2.55)		
1c	0.0834 CR4	0.0842	-0.0364	0.0465	0.0362	0.1690 MCDR	.2037	.172
	(3.78)	(4.56)	(2.67)	(2.46)	(3.43)	(3.16)		
2a	0.1135 C4						.2272	.078
	(5.23)							
2b	0.0515 C4	0.0800	-0.0419	0.0539	0.0388	0.0603 MID	.2094	.168
	(1.76)	(4.32)	(3.01)	(2.80)	(3.68)	(2.42)		
2c	0.0912 C4	0.0820	-0.0354	0.0446	0.0381	0.1736 MCDR	.2014	.180
	(4.17)	(4.46)	(2.62)	(2.37)	(3.64)	(3.28)		
3a	0.3143 H						.2478	.074
	(5.12)							
3b	0.1511 H	0.0805	-0.0425	0.0533	0.0388	0.0617 MID	.2180	.170
	(1.97)	(4.40)	(3.06)	(2.78)	(3.68)	(2.65)		
3c	0.2483	0.0847	-0.0353	0.0439	0.0383	0.1688 MCDR	.2174	.178
	(4.04)	(4.64)	(2.61)	(2.32)	(3.65)	(3.17)		

Source: Adapted from John E. Kwoka Jr., "The Effect of Market Share Distribution on Industry Performance," Review of Economics and Statistics, 66 (1): 103 (February 1979)

Table 2.5: Regressions with Two-Firm Concentration Coefficients

	FSD Variable	KQ	DISP	GROW	CDUM	Scale Variable	Constant	$\bar{R}^2$
1a	0.1528 C2 (5.53)						.2303	.086
1b	0.0853 C2 (2.43)	0.0786 (4.30)	-0.0423 (3.06)	0.0515 (2.68)	0.0391 (3.72)	0.0541 MID (2.30)	.2088	.178
1c	0.1243 C2 (4.49)	0.0824 (4.52)	-0.0361 (2.68)	0.0427 (2.28)	0.0385 (3.69)	0.1673 MCDR (3.16)	.2041	.187

Source: Adapted from John E. Kwoka Jr., "The Effect of Market Share Distribution on Industry Performance," Review of Economics and Statistics, 66 (1): 108 (February 1979).

improvement in R^2 and therefore plays no systematic part in industry performance (19:108).

The last article to be reviewed in this section is the most recent in the genre of those which have proceeded it. It was written by Robert Allen and as mentioned in the first chapter will serve as the standard against which much of the empirical work of this thesis will be measured. Allen's model was:

$$PCM = \beta_0 + \beta_1 I + \beta_2 CAR + \beta_3 NCO + \beta_4 KO + \beta_5 CDUM + \beta_6 DISP + \beta_7 GROW \quad (2.10)$$

KO and DISP are as defined in Chapter 1.

CDUM and GROW are as defined by Kwoka, though the source of selection for CDUM comes from Ornstein (25) rather than an FTC publication.

NCO is the number of companies in any given industry. As the number of companies increase in an industry it is to be expected their ability to collude will decrease. A large number may also be indicative of relatively low capital requirements, which means that even if collusion to maintain prices above costs were to occur it would not take long before new entrants would again force prices down.

CAR (Cost Advantage Ratio) is calculated as follows:

$$CAR = \frac{\dfrac{\sum_{i=1}^{4} VAdd_i}{NEmp_i}}{\dfrac{\sum_{i=5}^{8} VAdd_i}{NEmp_i}} \qquad (2.11)$$

where NEmp represents the number of employees in the ith firm. This is a measure of relative efficiency between the top firms of an industry and the next four largest.

I (Strategic Group Concentration) is defined as:

$$I = \frac{\sum_{i=1}^{4} VShip_i}{\sum_{i=1}^{8} VShip_i} \qquad (2.12)$$

where the index (i) represents a specific firm in an industry ordered in size from the largest to the smallest in value of shipments. The Strategic Group Concentration will increase in value as the market power of the top four firms of an industry increases.

Allen deleted 70 industries from the 451 available in the 1972 Census because they failed to coincide with well defined economic markets (2:937). Eighty additional industries were disqualified because they lacked either capital intensity, margin, or

concentration data. This left 297 industries for the analysis. Allen created an additional sub-grouping of 130 industries by finding the critical value of CAR at which significant scale economies were realized in the industry under consideration.

Some of Allen's results can be seen in Table 2.6. Both variables, I and CAR were statistically significant (2:938). NCO was less so. Allen's results indicate strategic group concentration to be a better measure of the market power wielded by the top firms in the industry rather than the Census concentration ratio.

Other Data Bases

Thus far, this chapter has considered the profitability industrial structure question from the viewpoint of Census data and those who feel concentration may play a major role in determining the profitability of a firm. Another school of thought as briefly described in the introduction does exits. But more importantly to this thesis, so do other sets of data exist which can have a bearing on this issue. These include the Profit Impact of Market Strategies (PIMS) data set as well as the FTC LOB data set which was outlined in the first chapter.

The PIMS program had its origins in the early sixties. It started as out as an internal planning study conducted by the General electric company (30:108). The program was eventually adopted by the Harvard Business School and grew to encompass many

Table 2.6: Comparison of Regressions Using C_4 vs. I

	C_4	I	CAR	NCO	KO	CDUM	DISP	GROW	R^2	$\bar{R}^2$
				297 Census Industries						
1_a	.080			.001	.081	2.278	-.033	-.004	.121	.102
	(3.212)[a]			(1.796)[c]	(3.952)[a]	(2.038)[b]	(-1.970)[b]	(-.329)		
1_b	.060		.063	.001	.090	2.119	-.040	-.009	.187	.167
	(2.223)[b]		(4.847)[a]	(1.820)[c]	(4.550)[a]	(1.974)[b]	(-2.468)[b]	(-.688)		
1_c		.264		.001	.088	2.558	-.036	-.011	.143	.125
		(4.607)[a]		(1.157)	(4.478)[a]	(2.339)[b]	(-2.172)[b]	(-.802)		
1_d		.192	.060	.001	.094	2.282	-.042	-.011	.204	.184
		(3.342)[a]	(4.702)[a]	(1.522)	(4.916)[a]	(2.158)[b]	(-2.614)[a]	(-.862)		
				130 Decreasing Cost Industries						
2_a	.164			.003	.076	4.839	-.049	-.018	.254	.217
	(4.676)[a]			(2.648)[a]	(2.667)[a]	(3.147)[a]	(-2.225)[b]	(-1.003)		
2_b	.141		.044	.002	.082	4.571	-.053	-.012	.284	.243
	(3.929)[a]		(2.280)[b]	(2.544)[b]	(2.908)[a]	(3.014)[a]	(-2.449)[b]	(-.657)		
2_c		.403		.002	.085	5.082	-.047	-.027	.293	.258
		(5.466)[a]		(1.812)[c]	(3.092)[a]	(3.408)[a]	(-2.194)[b]	(-1.527)		
2_d		.359	.041	.002	.089	4.786	-.052	-.020	.320	.281
		(4.766)[a]	(2.234)[b]	(1.873)[c]	(3.282)[a]	(3.246)[a]	(-2.440)[b]	(-1.142)		

Note: Figures in parenthesis are t-values. Significance levels of the coefficients (two-tail test) are: a. 1% level, b. 5% level, c. 10% level.

Source: Adapted from Robert F. Allen, "Efficiency, Market Power, and Profitability in American Manufacturing," Southern Economic Journal, 49 (4): 938 (April 1983).

companies. In the beginning of 1975, program administration was turned over to a non-profit organization called the Strategic Planning Institute. The data is collected on a business basis. A business is defined to be "a company component that competes in a well-defined ... market containing that component's relevant competitors" (18:87). As of 1982, over 200 companies were participating in the program which represented over 2000 separate businesses. Over 100 pieces of information are reported for each business (18:88). The institute takes this data and through empirical research develops models. These models attempt to capture the relationships of performance to structure and strategy. In return for providing information to the institute, the participating companies receive reports detailing the findings of the institute as well as individual analyses on the businesses they reported on (30:109).

Generally the institute focuses on relationships and not on theory. Outliers are either eliminated or their information compressed to fall within the limits of variation established for the program. Patterns are identified based upon three criteria (30:111):

1. They are significant at the 95% level or better.
2. They conform to theory. Theories may arise from the literature or from the empirical findings of the institute.
3. They make sense to business people who are knowledgeable of the experiences the findings are attempting to describe.

Multicollinearity, the correlation of independent variables used in a model to one another (23:272), was not originally a concern of the

institute planners (30:112). They did not hesitate to complicate their models whenever significant gains in statistical fit were brought about by the inclusion of a new variable (30:115).

Two individuals, Bradley Gale and Ben Branch, did undertake an investigation which concentrated on the more traditional profit-structure model using entirely PIMS data. Their results were published in 1982 (18).

Initially Gale and Branch focused on a very simple model which was reminiscent of Bain's.

$$ROI = \beta_0 + \beta_2 C_4 + \beta_3 MS \qquad (2.13)$$

MS is the market share of a firm in a particular industry and was calculated as the percentage of an industry's sales accounted for by that particular firm. The authors followed the 4-digit SIC classification of industries "where appropriate, but more relevant industry or market definitions are employed when the SIC data do not accurately reflect competitive conditions in the market" (18:89). Unfortunately, the authors do not elaborate on the type of adjustments they made to the SIC industry definitions.

They began by averaging the market share and concentration variable of their model over a four year period (18:88). Generally this encompassed the years 1976 to 1979, inclusive. Where data for certain businesses was incomplete for these years, they would include data from other years until their requisite four year

averages could be attained. The concept of averaging was discussed by Weiss (34:199). He and these authors both feel that doing so will smooth out short run disequilibrium effects in the different markets.

The authors used Return On Investment (ROI) for each business as their dependent variable.

$$ROI = \frac{\text{Profits (before taxes)}}{\text{Invested capital}} \qquad (2.14)$$

The results of performing the regression can be seen in Table 2.7. The authors' results differed from the work previously discussed in this paper because they found concentration to have little if any significance when compared to market share. Of course most of the previous work in this area, with the exception of Kwoka, did not have market share data to draw on. These findings tend to coincide with the work of Harold Demsetz. He questioned, in a paper published in 1973, the tendency of modern economists to look first for the evidence of monopoly in the economy rather than for other equally plausible explanations for the positive concentration profit relationship (12:1). Other possibilities, he contended, were lower costs incurred by large scale operations, the quality of management, or perhaps just blind luck.

Gale and Branch checked the possibility that their results were based upon a misspecified concentration ratio as had been put forth

Table 2.7

Regressions Using ROI

Equation	Constant	Share coefficient	Concentration coefficient	R^2	DF
1	16.6 (1.2)		0.10 (0.02)	0.017	1464
2	11.5 (1.2)	0.499 (0.027)	-0.020 (0.019)	0.199	1463
3	10.5 (0.8)	0.492 (0.026)		0.198	1464

Source: Adapted from Bradley T. Gale and Ben S. Branch, "Concentration Versus Market Share: Which Determines Performance and Why Does It Matter?," Antitrust Bulletin, 27: 90 (Spring 1982).

by Kwoka. First they divided their data into two groups (18:97). The first group was comprised of businesses ranked as first or second in their respective industries. The second group consisted of all the remaining businesses in each industry. Their results, shown in Table 2.8, continue to indicate market share and not concentration to be the prevailing influence in both groups.

The last paper to be reviewed in this chapter concerns non aggregated FTC data. The paper was written by David Ravenscraft. The origins of this data set and its content were reviewed in some detail in Chapter 1.

Ravenscraft included up to 23 variables in his models (27:30). The author looks at both Census and LOB data, sometimes combining them in a single model.

The major components of the LOB model include the following elements:

LBOPI is the LOB dependent variable. It is calculated as follows:

$$\text{LBOPI} = \frac{\text{Operating income}}{\text{Sales}} \qquad (2.15)$$

$$= \frac{\text{Sales} - \text{Materials} - \text{Pay} - \text{Adver} - \text{OSE} - \text{G\&AE} - \text{Depr}}{\text{Sales}}$$

where Pay is the LOB payroll, Adver is advertising outlays for the LOB, and OSE are Other Selling Expenses. G&AE are general and administrative expenses allocated by some method to each LOB

Table 2.6

Regressions of Market Share by Rank

Market share rank 1 or 2

ROI = 21.66 + 9.35*** Share index - 0.04 Concentration
(0.72) (0.54)

R^2 = 0.160
DF = 950

Market share rank 3 or lower

ROI = 20.18 + 6.83*** Share index - 0.05 Concentration
(1.63) (0.76)

R^2 = 0.033
DF = 530

Source: Adapted from Bradley T. Gale and Ben S. Branch, "Concentration Versus Market Share: Which Determines Performance and Why Does It Matter?," Antitrust Bulletin, 27: 100 (Spring 1982).

which the office services in a company (14:258), and Depr represents depreciation on company assets which are specifically used in the LOB or which can be allocated among several LOBs on a reasonable basis (14:258). Pay does not include the salaries of central administrative offices but is intended to capture the whole sum of monies payed out by the company to produce in a particular LOB (14:272). Other Selling Expenses includes all expenses incurred in promoting a product but which are not directly related to advertising. The biggest contributor would be the maintenance of company sale forces who make direct contact with potential customers (14:8).

To render the Census data more comparable to LOB data, Ravenscraft suggests subtracting the ratios of industry advertising to sales, R&D to sales, and depreciation to sales from the price cost margin as defined in Chapter 1 (27:22).

Ravenscraft claims there are crucial definitional differences between Census value of shipments and LOB sales. Unfortunately, the paper to which he refers the reader for an explanation of these adjustments is not available from the FTC. These calculations are crucial in determining useful market share values of each of the LOBs. The Market Share variable was obtained by dividing the adjusted LOB sales figures by the adjusted Census Value of Shipment figures (27:31).

Three market share interaction terms were included in the model to help determine the source of market share's positive

relationship with profits (27:23). The first, LBASSMS, includes the LOB advertising to sale ratio. A positive coefficient here would support the contention that firms with greater market share have more marketing power, and hence are able to attain a higher price for their products. The second, LBASSMS, includes the total assets to sales ratio and would indicate the presence of scale economies if its coefficient were positive. The last interaction variable, LBRDMS, includes the ratio of R&D expenditures to sales. A positive relationship here would lend credence to the theory that larger firms, because they have more money to spend on research and development, also take industry leadership in product innovation and hence can charge higher prices because of their premium quality products.

The author again uses the same three basic variables in forming a check for the effects that different investment strategies might have on a firm's profitability. From the three variables he develops both an industry and LOB measure, as well a set of interaction terms with market share. The industry data variables are aggregated from LOB data. They are formed by dividing LOB market share by the percentage of an industry covered by the LOB sample to obtain a relative weight, and then multiplying the weight by the LOB values for the industry. Ravenscraft states that the industry variables may offer some measure of entry barriers existing in a particular market (27:23). A positive relationship between profitability and the LOB variables may be an indication of

efficiencies in the firm. Should these efficiencies be attributed to scaled economies or be persistent in time, the interaction terms should show a positive relationship.

The Input-Output Tables of 1972 were used extensively. The variable, IMP was obtained by dividing the import figures in the tables by the VShip in the Census (27:30). A measure of exports, EXP, was obtained in a similar manner. The variables were apparently included as a control for the US trade imbalance (27:25).

Buyer and seller concentration ratios (BCR and SCR) as well as dispersion indices (BDSP and SDSP) were also obtained (27:30). The buyer ratio attempts to capture the amount of industry output taken by the four largest purchasers (20:477). Similarly the seller concentration ratio captures the amount of industry output sold by the four largest firms. High concentration on the part of the buyers may infer to them an ability to name their price. High concentration for sellers will make it possible for them to sustain a certain price. Martin's paper (27:25) which discussed the effects of buyer and seller dispersion could not be traced. Mere conjecture would indicate that the more geographically dispersed are the sellers or buyers of different products, the less able will they be to effectively steer prices away from their competitive values. The data for two variables were based on work by Weiss. One considered the distance in which 80% of the output of an industry was shipped (DS). The other (CR_4) was an adjusted concentration ratio. Weiss's

paper could not be obtained and so the exact calculations involved are unknown for the purposes of this thesis.

One of Ravenscraft's more intriguing variables (LBCU) attempted to measure the utilization of capital assets over a given year. This knowledge can be of use to macroeconomists as they attempt to predict the ability of the economy to grow in a future period (4:115-116). The variable is formed by taking the ratio of the current year's sales to the previous year's. Values greater than one are set equal to one, in effect saying an increase in capital usage occurred. Firm assets are then multiplied by this ratio to get the percentage of utilization.

Vertical integration describes the extent to which a single firm controls the migration of a product from the initial use of raw materials to the output of a final good (22:187). A firm can gain some cost advantage if it possesses the manufacturing capability to produce a product and not have to deal with other firms to complete intermediate stages. Ravenscraft measures this capability with a dummy variable (LBVI) (27:24). The variable was set equal to one if the FTC felt that several LOBs of a firms were sufficiently tied together to allow them to report on a combined basis. Generally this occurred if total sales or costs of an LOB could be traced to another LOB in the same firm and these sales or costs exceeded 50% of the LOB's totals. A similar aggregated industry measure (INDVI) was also calculated using the weighting techniques described above. LBVI will have a positive effect on profitability if a reduction in transaction

costs actually occur, while INDVI will have a similar effect if vertical integration creates an entry barrier or makes collusion more viable (27:24).

Ravenscraft also attempted to measure for possible effects of diversification on competition using ideas originally established by John Scott (31:368). Scott believed that as more firms become diversified they would begin to meet in more markets and hence their opportunity to collude would increase. He hypothesized this phenomena would be more likely to occur in markets where both seller concentration and multimarket contact are high. Firms in this situation would recognize their interdependence on one another and hence seek to not compete away their potential profits (31:372). Ravenscraft's measure of these tendencies was as follows (27:24):

$$LBDIV = 1 - \frac{\sum_{i=1}^{n} SLS_i}{\left(\sum_{i=1}^{n} SLS_i\right)^2} \qquad (2.16)$$

SLS_i represents sales of a firm in its ith LOB.

n is the number of LOBs in which the firm participates.

This might be recognized as a form of the Herfindahl index (see above). Generally, the greater the value of LBDIV, the more diversified the firm. A weighted industry measure (INDIV) was also devised.

The measure of minimum efficient scales was identical to the one used by Caves, Shirazi, and Porter with the exception that data was drawn from the 1972 Census.

A growth variable (GRO) was included which coincided with the definition in Chapter 1. Although, the author used 1976 ASM data instead of 1977 Census data.

The final variable discussed by the author, but not part of the model, was a measure of the coverage of a given industry by those included in the LOB data. It was calculated as the sum of market shares for a particular industry included in the LOB data probably divided by VShip for that industry as reported in the Census (27:30). The author made no mention of the division; however, he did refer to the variable as a ratio. The 3,186 LOBs represented in the FTC data covered about 47.5 % of total sales for each industry on average (27:24).

Ravenscraft found it necessary to eliminate certain LOB data just as other authors discussed in this chapter found it necessary to eliminate certain industries from the Census data. The reasons though were somewhat different. Originally the 1975 LOB data set contained 3,548 LOBs coinciding with 261 4-digit FTC categories. The author eliminated 363 LOBs because they were not reported on in either the 1974 or 1976 LOB data sets. Additional LOBs were dropped because they contained data from firms which recently started activity in the LOB or they contained data from firms which went out of business. After these "births and deaths" were eliminated, 258

FTC categories still contained data from at least one firm.

Some comparisons showed the 1975 FTC data set to be somewhat reliable. The correlation of fixed capital asset figures between this data set and the 1975 Survey of Manufacturers was 0.9 (27:24). The correlation was 0.8 when the advertising figures from the LOB data were compared to similar data available in the Input-Output Tables.

Ravenscraft discusses two models and the results they give. Table 2.9 shows the model without interaction terms. Note the signs on the concentration ratio (C_4), the advertising to sales ratio (LBADVR), and the capital output measure (LBASS) are all negative. Theory would predict a positive relationship for all three. Table 2.10 shows the model with interaction terms, though most of the linear terms were omitted that were affected insignificantly by the additional variables (27:28). This time the sign for C_4 is positive while the other two mentioned previously continue to show the wrong negative sign. The three major findings were that increased capacity utilization, industry growth, and market share all had a positive effect on profits. Concentration played apparently no part in the equation, even when the author divided the data into producer and consumer categories in the spirit of Collins and Preston or when he divided the data into convenience versus nonconvenience items. No mention is made of the particular method he used in doing either.

This chapter has summarized some of the ways in which previous authors have used available data in order to ascertain the

Table 2.9: Results without Interaction Terms

Variable	Line of Business (N = 3186) LBOPI		Industry (N = 258) INDPCM	
Name	OLS	GLS	OLS	GLS
Intercept	-0.2227	-0.1985	-0.0046	0.0334
	(-5.27)	(-6.05)	(-0.08)	(0.70)
CR4	-0.0218	-0.0222	0.0322	0.0375
	(-1.34)	(-1.77)	(1.31)	(1.67)
MS	0.1833	0.1476		
	(4.90)	(5.51)		
MES	0.2142	0.1761	0.1932	0.0703
	(1.94)	(2.05)	(1.51)	(0.56)
BCR	0.0544	0.0552	-0.0311	-0.0184
	(3.25)	(4.48)	(-1.15)	(-0.82)
BDSP	-0.0066	-0.0046	-0.0177	-0.0314
	(-0.67)	(-0.64)	(-1.18)	(-2.16)
SCR	-0.0394	-0.0314	-0.1651	-0.1808
	(-1.27)	(-1.39)	(-3.70)	(-4.26)
SDSP	-0.0503	-0.0459	-0.1669	-0.1520
	(-2.53)	(-2.86)	(-5.14)	(-4.41)
GRD	0.0520	0.0384	0.0197	0.0213
	(7.21)	(6.70)	(1.69)	(1.99)
IMP	-0.0637	-0.0401	-0.0097	-0.0270
	(-5.06)	(-2.23)	(-0.58)	(-1.54)
EXP	0.0299	0.0651	-0.0121	-0.0487
	(0.65)	(1.73)	(-0.17)	(-0.68)
DS	-0.0157	-0.0127	-0.0208	-0.0002
	(-2.38)	(-2.52)	(-1.93)	(-0.02)
LBVI	0.0133	0.0101		
	(1.52)	(1.55)		
INDVI	-0.0310	-0.0326	-0.0472	-0.0604
	(-2.49)	(-3.39)	(-2.68)	(-3.44)
LBDIV	0.0205	0.0143		
	(1.78)	(1.65)		
INDDIV	-0.0177	-0.0283	0.0174	0.0199
	(-0.88)	(-1.87)	(0.60)	(0.76)
LBADV	-0.0268	-0.0249		
	(-0.30)	(-0.35)		
INDADV	0.2473	0.2284	0.3174	0.2457
	(2.04)	(2.29)	(2.02)	(1.49)
LBRD	-1.0339	-0.4746		
	(-12.00)	(-3.68)		
INDRD	0.2584	-0.2488	-0.6187	-0.6872
	(1.55)	(-1.51)	(-2.33)	(-2.44)
LBASS	-0.0820	-0.0240		
	(-13.72)	(-2.82)		

Table 2.9 (con't)

Variable Name	Line of Business (N = 3186) LBDPI OLS	LBDPI GLS	Industry (N = 258) INDPCM OLS	INDPCM GLS
INDASS	0.0776 (5.69)	0.0600 (4.98)	0.0887 (4.54)	0.1094 (4.92)
LBCU	0.2342 (12.97)	0.1919 (11.44)		
INDCU	0.0197 (0.48)	0.0410 (1.25)	0.2242 (4.00)	0.1623 (3.64)
R^{2a}	0.2081	0.1280	0.4310	0.4296

Note: t-statistics are in parentheses.

[a] R^2 in the GLS regressions is computed from the F-statistic obtained by constraining all the coefficients to be zero, except the heteroscedastic adjusted constant term. This measure of R^2 also applies to the OLS equation and thus permits the fit of the two equations to be compared in some general sense.

Source: Adapted from David J. Ravenscraft, "Structure-Profit Relationships at the Line of Business and Industry Level," Review of Economics and Statistics, 65 (1): 26 (February 1983).

Table 2.10: Results with Interaction Terms

Variable Name	LBOPI	
	OLS	GLS
CR4	0.008	-0.0139
	(0.04)	(-0.95)
MS	-0.1110	-0.0086
	(-0.84)	(-0.09)
MES	0.0829	0.1115
	(0.57)	(0.94)
LBADV	-0.1213	-0.1554
	(-1.25)	(-2.00)
INDADV	0.2008	0.1486
	(1.64)	(1.45)
LBRD	-1.0398	-0.4772
	(-11.80)	(-3.49)
INDRD	0.2776	-0.2129
	(1.62)	(-1.28)
LBASS	-0.0910	-0.0314
	(-14.57)	(-3.41)
INDASS	0.0529	0.0524
	(3.64)	(4.22)
LBCR4MS	-0.4276	-0.1046
	(-2.24)	(-0.72)
LBMESMS	1.196	0.3105
	(1.17)	(0.42)
LBADVMS	2.6604	3.2375
	(2.22)	(4.16)
LBRDMS	1.2121	0.2953
	(0.88)	(0.24)
LBASSMS	0.6096	0.2220
	(5.15)	(2.11)
R^2	0.2191	0.1352
Sample Size	3,186	3,186

Note: t-statistics are in parentheses.

Source: Adapted from David J. Ravenscraft, "Structure-Profit Relationships at the Line of Business and Industry Level," Review of Economics and Statistics, 65 (1): 27 (Feb 1983)

relationship between market structure and profitability. Because the emphasis was on data, much of the finer detail of the results found by these authors were excluded. The interested reader is referred to the extensive bibliography if greater knowledge is desired. The model which is developed in the following chapter is derived wholly from the definitions contained in this chapter. Generally, only variables found to be significant in the work of these authors were considered for inclusion.

III. Methodology

The project was accomplished in three distinct phases: data entry, creation of the appropriate data bases, and the analysis conducted using these data bases.

Data Entry

The Data Entry phase consisted of manually entering all the required data with the aid of an Apple Macintosh computer. Fortran programs were devised to direct the sequence of entry and to help assure the quality of the data being entered. The first program, CENSUS ENTER (see Appendix A) was used to form the initial data base of raw Census data. Various utility programs were created and used to add other Census data elements to this data base as they were required. Similarly, program FTC ENTER (see Appendix B) allowed for the precise entry of raw FTC data into either one of two other data bases. One of these data bases was for 1975 Line of Business (LOB) raw data and the other one was for 1976 LOB raw data. Both programs queried the user to enter values for either an Industry or LOB entry. The programs would then display all the entered data for each industry or LOB and ask the user if all of the displayed values were correct. If the answer was no, the program would then ask for the line number of the item in error. Based upon the user response, the program then displayed the name of

this data item and asked the user to enter its new value. The program then redisplayed the data values for the industry or LOB and again asked if all values were correct. This process continued until the user verified all the displayed values were correct at which point the program wrote the entry into the appropriate raw data base file.

The data entered into the Census raw data base came predominantly from the Annual Survey of Manufactures information which is contained in the Historical Statistics Tables of the Census (6). Some data elements had to be taken from the 1977 (6) and 1972 (7) Censuses of Manufactures if these were the only known sources.

Line of Business data from the FTC was available for four years: 1973, 1974, 1975, and 1976. The 1973 data set was experimental and hence provided only a limited number of data items on a relatively small sample size. Data from 1974 was considered suspect since this was the last year of wage and price controls. However, inventories reported for this year for each line of business were included in the FTC 1975 raw data base to make certain computations possible. This left 1975 and 1976 data for use in the bulk of the analysis. A 1977 set has purportedly been printed but was not available for this effort (1). Only those FTC LOBs corresponding to Census four digit industrial codes were included in the data bases. This was because the concentration ratio (C_4) and the Strategic Group Concentration ratio (I) were available only in the Census industry statistics Table 8 (6)

which is compiled at the four digit level for a Census year. This eliminated 150 LOBs from inclusion in the data base.

Data Base Construction

The data entry provided three raw data bases to work with. Both an FTC and Census data base suitable for economic analysis were constructed from these data bases. Two additional programs, CENSUS BUILD and FTC BUILD were written in Fortran to accomplish this task (see Appendices C and D).

The CENSUS BUILD program calculated a Price-cost margin (CPCM), a concentration measure (I), five control variables (Disp, GROW, ImportsToSales, ExportsToSales, and KO), an efficiency measure (CAR), and six barrier to entry measures (MID, MES, CDR, MCDR, MESD20, and AdvrToSales). Six additional variables were passed without further enhancement to the final Census data base from the raw Census data base (SIC, C4, NCO, VShip, VAdd, and Payroll).

Calculated values for CPCM and KO, in addition to the passed variables VShip, VAdd, and Payroll were included in the Census data base for both the years 1975 and 1976. The simple averages for KO and CPCM also were computed by CENSUS BUILD and placed in the data base.

The Census Price-Cost-Margin (CPCM) was identical to that used by Collins and Preston (11:285), and Allen (2:934). See Chapter I for the calculation. Three margins were derived for three distinct

periods. One each for 1975 (CPCM75), 1976 (CPCM76), and the average of the CPCM (CPCM7576) for the two years. The information for payroll, Value Added (VAdd), and Value of Shipments (VShip) for the years 1975 and 1976 was taken from the Historical Statistics for the Industry of the 1977 Census (6).

The Strategic Group Concentration ratio (I) was identical in derivation to that used by Allen (see Chapter 2 for the calculation). The Value of Shipment figures for the four largest and eight largest companies were obtained from the Concentration in Manufacturing Tables of the 1977 Census (6).

The Control variables were included to correct for some of the previously mentioned deficiencies of the Census Price-Cost-Margin. The dispersion ratio (Disp) was defined in Chapter 1. The Value Added per region (Northeast, North Central, South, and West) as well as the total Value Added by US manufacturing were obtained from the 1972 Census (7:XX). Regional figures for Value Added by a particular four digit industry came from the Census General Statistics by Geographic Area Table (7). The 1972 Census was used since this type of data was excluded from public release in the 1977 Census (6:XV). The industry growth measure (GROW) was defined in Chapter 1. Data for Value of Shipments 1972 and 1977 for each industry came from "Historical Statistics for the Industry: 1977 and Earlier Years" (6). Imports to Sales and Exports to Sales were identical in definition and source to those used by Ravenscraft and are defined in Chapter 2. The dollar amount of exports and imports for each industry was taken from

columns 94 and 95 respectively of the 1977 Input-Output Table entitled, "The Use of Commodities by Industries" (8:77). The calculation of KO was based on the division of "Gross value of fixed assets" as contained in the "Historical Statistics for the Industry: 1977 and Earlier Years" Table (6) by the Value of Shipments figure found in the same table.

The lone efficiency measure, the Cost Advantage Ratio (CAR), was defined in Chapter 2. The Value Added and Number of Employees for the top four and next four companies was obtained from the Concentration in Manufacturing Tables of the 1977 Census (6).

Five of the six barrier to entry calculations (minimum Efficient Scales [MES], Midpoint Plant Size [MID], Adjusted Midpoint Plant Size [MCDR], Adjusted Minimum Efficient Scales [MESD20], and Cost Disadvantage Ratio [CDR]) were based upon the "Industry Statistics by Employment Size of Establishment: 1977" Table (6). All these calculations required the determination of a mid point for either the Value of Shipments distribution for an industry or the Value Added distribution.

MID represents the approximate output of a hypothetical plant located in the center of the Value of Shipments versus Employment class distribution. MES, on the other hand, is the average size of all plants in the top fifty percent of the Value of Shipments versus Employment class distribution. The calculations performed to determine both MID and MES began by dividing the total Value of Shipments for each industry by two. The program, CENSUS BUILD,

then started adding the Value of Shipments for each employment class beginning with the smallest until the accumulated total equaled or exceeded the computed 50 percent of the total Value of Shipments figure. The value of MID was then calculated by dividing the Value of Shipments for the employment class in which the fifty percent level was exceeded by the number of establishments in that class.

The derivation of MES followed by first accumulating both the Value of Shipments and number of establishments for each of the employment classes preceding the one in which the fifty percent of total Value of Shipments for the industry was exceeded. The calculated value of MID was used as an increment representing the Value of Shipments for a single establishment. The accumulated Value of Shipments figure was then increased by MID until the fifty percent level was again exceeded. The number of times this occurred represented the number of establishments within the class to the midpoint. The calculation of MES proceeded according to the following equation:

$$MES = \frac{(VShip77 - RunVShip)}{\frac{(TtlEstablishments - IncrementEst)}{VShip77}}$$

where:

VShip 77 is the total industry shipments for 1977,

RunVShip is the accumulated Value of Shipments to the midpoint,

TtlEstablishments is the total number of establishments represented in the Census for the industry under consideration, and

IncrementEst is the total number of establishments accumulated up to the midpoint of the distribution.

The Cost Disadvantage ratio (CDR) was calculated in a similar manner to MES. CDR is the ratio of the average productivity of a worker in a plant occupying a position in the lower fifty percent of the Value Added versus Employment class distribution to the average productivity of a worker in a plant occupying a position in the upper fifty percent of the Value Added versus Employment class distribution. Values of CDR close to one infer there are no apparent advantages associated with economy of scales in the industry. Values considerably less than one imply such economies do exist and may present a barrier to entry. The center of the Value Added distribution was found and the Value Added for each employment size class accumulated, beginning with the first, until the fifty percent industry Value Added figure was exceeded. An increment was then established by dividing the Value Added of the employment class where the fifty percent level was exceeded by the number of employees in the same class. The increment was continually summed to the Value Added, which was accumulated up to the midpoint class, until the fifty percent level was again exceeded. This

marked the midpoint of the Value Added versus employment class distribution. The fraction of Value Added for the midpoint employment class which is less than the midpoint was calculated as

$$\text{Fraction} = \text{RunVAdd}/\text{ClassVAdd}$$

where:

RunVAdd was the Value Added of the midpoint employment class accumulated to the actual industry Value Added midpoint contained in that class, and

ClassVAdd was the value added by the midpoint class.

This fraction was then multiplied by the number of employees in the midpoint class to obtain the number of employees in the class represented up to the industry Value Added midpoint. This number was then added to the accumulated number of employees in the previous employment classes, if any. This value becomes the employment figure for the bottom fifty percent of the Value Added distribution. The upper value is simply the difference between the lower value and the total number of employees represented in the industry. The value of CDR is then calculated as follows:

$$\text{CDR} = \frac{(\text{LowerVAdd}/\text{LowerEmp})}{(\text{UpperVAdd}/\text{UpperEmp})}$$

where:

LowerVAdd is the Value Added by the bottom fifty percent of the Value Added distribution (note this does not necessarily equal fifty percent of total Value Added for the industry),

UpperVAdd is the Value Added by the top fifty percent of the Value Added distribution,

LowerEmp is the number of employees in the bottom fifty percent of the Value Added distribution and,

UpperEmp is the number of employees in the top fifty percent of the Value Added distribution.

The values MCDR and MESD20 were each calculated as the product of MID or MES respectively and an indicator variable determined by the value of CDR. For MCDR, if CDR was less than 0.75, the indicator variable was set to one. For MESD20, if CDR was less than 0.80, the indicator variable was set to one. These critical values are taken from the works of Kwoka and Caves respectively and were discussed in Chapter 2.

The Census Advertising to Sales ratio was calculated by dividing the dollar value of advertising consumed by each industry (row item 73.02 of the Input-Output Tables [10]) by the total value of shipments for the industry as taken from Table 1a of the 1977 Census (6).

The calculations made by the FTC BUILD program, see Appendix D, were less sophisticated but many times more numerous than those of CENSUS BUILD. Three representations of each variable were created covering the years 1975, 1976, and the average of the two.

FTC BUILD used only FTC LOB data derived from the Aggregate Financial and Statistical Data Table, hereafter referred to as the FTC Master Table, from the FTC Line of Business Reports of 1975 and 1976. The item number which uniquely identifies each type of data in this table will be provided in parentheses in the following narrative when first mentioned.

Calculations involving the FTC categories Media Advertising Expenses (item numbers 9 and 14); General and Administrative Expenses (item numbers 11 and 16); Gross Plant, Property and Equipment (item numbers 19 and 25); and All Other Assets (item numbers 23 and 29) consist of both a traceable and non-traceable component. Traceable expenses and assets are defined as those "which a company can directly attribute to a line of business or which can be assigned to a line of business by use of a reasonable allocation method developed on the basis of operating level realities" (14:272). Non-traceable expenses were assigned by a company using whatever basis it felt to be most appropriate. The only requirement was that the exact method of allocation be spelled out (14:258). This study made the assumption that the allocation of non-traceable expenses by the companies were accurately assigned to the proper LOB. Hence the traceable and non-traceable expenses and assets for all the variables listed above were added together to form a single value for the respective LOBs.

One Price-Cost-Margin was calculated in FTC BUILD (Line of Business Operating Income to Sales [LBOPI]), four control variables

(Capital Output to Sales [KOftc], Depreciation to Sales [DeprToSales], Capital Utilization ratio [LBCU], and Asset to Sales ratio [LBASS]), and two barrier to entry variables (Advertising to Sales ratio [LBADV] and company invested Research and Development to Sales [LBRD]). Each of these variables were, as their name implies, obtained by taking one data element of the FTC Master Table and dividing it by that Line of Business's total sales (item number 6).

It is worth noting that the only three variables directly comparable between the two data bases, FTC and Census, are the Price-Cost-Margins, Advertising to Sales ratios, and the Capital output measures. The Price-Cost-Margin was one suggested by Ravenscraft (27:22) and was discussed in Chapter 2.

Another FORTRAN program, MASTER BUILD (see Appendix E), combined the elements of the FTC and Census data bases into a single integrated data base (see Appendix F) upon which actual statistical analysis was performed. The program also computed Ravenscraft's Industrial Price-Cost-Margin (INDPCM) since this margin is derived from both types of data. The calculation of this margin proceeded as follows:

$$INDPCM = CPCM - LBADV - DeprToSales - LBRD$$

where all the variables have been previously identified. This variable was not used in the analysis conducted for this thesis but is

contained in the master data base and may be of use to future researchers.

Analysis

The analysis pursued in this thesis can be divided into four parts. First, a very general test for the differences in the variability and comparability of the two data sets was conducted. Second, the pairwise correlation matrix was obtained and analyzed for significant interactions. Third, a general statistical approach was used to detect differences arising between linear regressions of the same model but interchangably using elements of both the FTC and Census data sets where possible. Finally, some individual regression results were considered in view of the economic phenomena the different models were trying to capture.

Data Variability and Comparability.

Only the following three variables were comparable between the two data bases: the Price-Cost-Margin, the Advertising to Sales Ratio, and the Capital-Output ratio. Some general population statistics are contained in Table 3.1.

Table 3.1: Data Variability

Variable Name	Mean-Census	σ-Census	Mean-FTC	σ-FTC
PCM	.2894	.0740	.0862	.0498
Advr	.0106	.0212	.0158	.0230
KO	.3493	.1919	.4761	.3086

A statistical test (21:400) was used to compare the variability of each of these items in the two data bases. The variability of the Price-Cost-Margin was found to be greater in the Census data base than in the FTC data base. The variability of the Capital-Output ratio was found to be greater in the FTC data base. And finally the variability of the Advertising to Sales ratio was equivalent between the two data bases. Other tests which compared the means for the three variables in the two data bases provided identical results.

Significant Interactions.

A pairwise correlation matrix was derived using BMDP (13) and is shown in Table 3.2. The program was executed in such a way that as long as both pairs of variables were included in a specific case, that case was included for the correlation calculation. Generally any interaction exceeding 0.20 was considered significant at the α = 5% level (see Neter [20:503] for a method to determine the critical value).

Variables which should have been highly correlated and were included the following pairs: I and C4 (0.84), K07576 and KOftc7576 (0.76), AdvrToSales and LBADV7576 (0.83). The correlation between I and C4 compares well with Allen's result of 0.80 (2:937). The variable I is generally less correlated to the other variables in the model than is C4. Regressions which were alike in every aspect except for their use of I and C4 generally performed slightly better (gave higher values of $\bar{R}^2$) when the variable I was used. For these reasons all

Table 3.2: Comparisons With Previous Work

Using Census Concentration

Dependent Variable	C_4	Disp	KO 7576	Advr/ Sales	CDUM	GROW	MCDR	CAR	NCO	R^2
Study's Results:										
CPCM7576	.0949[a]	-.0345	.0566	1.3103[a]	.****	.0372[b]	-.4150	.****	.****	.2482
Kwoka's Results:										
PCM	.0834[a]	-.0364[b]	.0842[a]	.****	.0362[a]	.0465[b]	.1690[a]	.****	.****	.1720
Study's Results:										
CPCM7576	.0179	-.0489[b]	.0686[c]	1.0470[a]	.****	.0570[a]	.****	.0434[a]	.0000	.3068
Allen's Results:										
PCM	.0600[b]	-.0400[b]	.0900[a]	.****	2.1190[b]	-.0090	.****	.0630[a]	.0010[c]	.1670

Using Strategic Group Concentration

Dependent Variable	I	Disp	KO 7576	Advr/ Sales	CDUM	GROW	MCDR	CAR	NCO	R^2
Study's Results:										
CPCM7576	.0798	-.0496[b]	.0686[c]	1.0567[a]	.****	.0560[a]	.****	.0395[b]	.0000	.3150
Allen's Result:										
PCM	.2640[a]	-.0360[b]	.0880	.****	2.282[b]	-.0110	.****	.0600[a]	.0010	.1840

Significance levels are: a. 1%, b. 5%, c. 10%.

regressions carried out in the course of this analysis used I instead of C4. The correlation of the advertising to sales measures of the two data bases compared favorably with that found by Ravenscraft (27:24), but the two capital intensity measures were shown by the study to have a correlation coefficient of only 0.76, whereas Ravenscraft showed a much higher correlation coefficient of 0.9 (27:24).

The Price-Cost-Margins should have all been highly correlated. CPCM7576 and INDPCM7576 were (0.86), however the correlation of LBOPI with both CPCM7576 and INDPCM7576 was only moderate, as can be seen in the table.

CAR was slightly to moderately correlated with I, C4, and both advertising to sales ratios. This is not unreasonable given the possibility that scale efficiencies and concentration can be realized simultaneously, and that for the firms which have them, the presence of scale economies which lead to higher profit margins can lead to higher advertising expenditures.

The possibility of using different data sources for specific independent variables to help break up collinearity is suggested in the table. Two such combinations are noted here. The dispersion index (Disp) is slightly correlated with both the FTC capital intensity measure (KOftc7576) and the Census advertising intensity measure (AdvrToSales). But Disp is not correlated with either the FTC advertising intensity measure (LBADV7576) or with the Census capital intensity measure (KO7576). Regressions 5e and 5f of Table 3.5 do

involve these particular data base specifications for the independent variables mentioned. Note the large improvement in R^2 for both regressions.

General Difference Tests.

Both portions of the analysis were conducted on four models. The first model was:

$$Margin = f(I,Disp,KO,Advr,GROW)$$

which is very similar to Allen's basic model discussed in Chapter 1. The two notable differences are that an advertising to sales ratio (Advr) is used in place of CDUM as a perhaps more precise estimate of the effect of advertising intensity on profitability, and NCO, the number of companies is excluded in view of Allen's regressions which showed the variable to have little influence (2:938).

The next three models added a different variable to the basic model. Model two added the interaction effect of the Mid point plant size (MID) and the Cost Disadvantage Ratio (CDR) as suggested by Kwoka (19:102). Model three added the Cost Advantage Ratio as suggested by Allen (2:935). Model four added the FTC measure of company incurred Research and Development costs as suggested by Ravenscraft (27:23). Each of these variables are discussed in Chapter 2. Both the FTC and Census price-cost margins were used as dependent variables in regressing the equations. The Ravenscraft margin (INDPCM) was not used in this study.

The general F test (23:290) was employed to detect any differences arising between two regressions. The only difference in the composition of the regressions was in the source of data for one or two of the independent variables. One regression might use, for example, the Census values for the capital-output and advertising to sales ratios, while the second regression involved the use of the FTC values for the same variable.

The general F test itself is derived from the basic assumption that as variables are added to a model, the Sum of Squares Error (SSE) for the model should decrease as more of the total error (SSE + Sum of Squares Regression [SSR]) is explained by the regression. The F statistic itself is calculated from the following equation:

$$F^* = \frac{SSE(R) - SSE(F)}{(n - p) - (n - p)} \div \frac{SSE(F)}{(n - p)} \qquad (3.1)$$

where:

SSE(R) is the sum of square errors for the reduced model (i.e., the SSE from the model run without the additional variables),

SSE(F) is the sum of square errors for the full model (i.e., the SSE of the model run with the additional variable or variables),

n is the number of observations included in the regression,

q is the number of variables in the reduced model, and

p is the number of variables in the full model (23:291,292). Small values of F^* indicate that the additional variables offer little increase in the models ability to explain the dependent variable. This is because the difference in the SSEs of the two models is small when their respective degrees of freedom are taken into account. Large values of F^*, generally greater than four (9), indicate the additional variables are of some value in the model.

The use of the general F test in this thesis closely parallels an example described in Neter, Wasserman, and Kutner (23:344). Consider the following linear representations of model one:

$$CPCM = \beta_1 I + \beta_2 Disp + \beta_3 KO7576 + \beta_4 AdvrToSales + \beta_5 GROW$$

where:

I, Disp, and GROW are as explained in Chapter 1,

KO7576 is the Census representation of the average Capital-output ratio for the years 1975 and 1976, and

AdvrToSales is the Census Advertising to sales ratio

and

$$CPCM = \beta_0 + \beta_1 I + \beta_2 Disp + \beta_3 KOftc7576 + \beta_4 LBADV7576 + \beta_5 GROW$$

where:

KOftc7576 is the average of the FTC Capital-output ratios for the years 1975 and 1976, and

LBADV7576 is the average of the FTC Advertising to sales ratios for the years 1975 and 1976.

The question to be answered is whether or not the regression equations which arise from the statistical analysis of these two representations are equivalent to each another. The data used to calculate F* (Eq3.1) comes from the regressions of the following two representations of the model:

$$CPCM = \beta_0 + \beta_1 I + \beta_2 Disp + \beta_3 KO + \beta_4 Advr + \beta_5 GROW \tag{3.2}$$

and

$$CPCM = \beta_0 + \beta_1 I + \beta_2 Disp + \beta_3 KO + \beta_4 Advr + \beta_5 GROW + \beta_6 Ind + \beta_7 Ind*KO7576 + \beta_8 Ind*LBARD7576 \tag{3.3}$$

where:

IND is a indicator variable set equal to one if the observation of the Capital-output ratio and Advertising to Sales ratio for the industry comes from the FTC data set and is zero if these values come from the Census set,

KO is the Capital-output ratio from the Census or FTC data base depending upon the value of IND,

and

Advr is the Advertising to Sales ratio from the Census or FTC data base depending upon the value of IND.

Equation (3.2) is referred to as the Reduced form of the model and equation (3.3) is referred to as the Full form of the model. The equations obtained by regressing (3.2), and (3.3) are considered equivalent if the Sum of Square Errors obtained when regressing the reduced model is not significantly different from the Sum of Square Errors obtained for the full model. This amounts to the following test of hypotheses:

$$H_0: \beta_6 = \beta_7 = \beta_8 = 0$$
$$H_A: \text{not all three equal zero}$$

for if the null hypothesis is true, then the full form of the model takes the appearance of the reduced form of the model. After running the regressions of the two formulations, the following results were obtained:

$$SSE(R) = 0.7257618$$
$$SSE(F) = 0.7141556$$
$$p = 9$$
$$q = 6$$
$$n = 197$$

From this data a value of F^* (Eq3.1) can be calculated as follows:

$$F^* = \frac{0.7257618 - 0.7141556}{9 - 6} \div \frac{0.7141556}{197 - 9} = 1.0184361$$

The F value when testing at the $\alpha = 5\%$ level is approximately 2.600. Since F^* is less than the F value ($1.02 < 2.600$) the test fails to reject the null hypotheses that the two regression equations are the same.

Appendix G contains the results of the same type of computations for many other potential regressions of the four basic models. The results for the example can be found by looking for the paragraph headed by CPCM = f(I,Disp,KO,Advr,GROW). The pairs of labels directly beneath this heading further define the regression. The occurrence of both a Census and FTC variable name for the two labels indicates that only one independent variable is being tested for differences between the two data bases. The first pair of labels in entry one of the appendix are KO7576 and KOftc7576 for example. They indicate only the Capital-output values from the Census and FTC data bases are being tested against one another. The default for the advertising to sales variable in any of the regressions when not specifically identified by one of the labels is the Census figure. The same holds true for the Capital-Output ratio. Hence the two regressions being compared as indicated by the first pair of labels are:

CPCM = f(I,Disp,KO7576,AdvrToSales,GROW) and

CPCM = f(I,Disp,KOftc7576,AdvrToSales,GROW)

The table value for the F test example computed above then is found by locating the labels (KOftc7576 and LBADV7576) which corresponds to an F^* of 1.017766. The F value for the test is located to the right of this value. The decision to accept or reject the regression is identified in the fifth column. As for the computations made above, the test fails to reject the null hypothesis. The difference in the F^* value of 1.0184361 as previously computed and the table value is due to roundoff error.

In Appendix G, some of the entry headings are followed by either the words, Case Omitted or Standard vs Omitted. For example, the heading of entry three is followed by the words Case Omitted. The reader will note that the basic model representation for entry three is identical to the identified basic model representation for entry one, namely:

$$CPCM = f(I,Disp,KO,Advr,GROW)$$

The only difference between the two entries is that the series of regressions performed for entry three omitted the most influential case identified by their counterparts of entry one. This was done in order to measure the relative sensitivity for the comparisons of entry one to the effects of potential outliers. The disagreement between the results of the first two F comparisons made for entry one and the first two of entry three indicate there does exist a

relative sensitivity to the effects of outliers for the first two comparisons. The most influential case was identified by use of Cook's distance (33:108) as computed by the Biomedical Computer Program (BMDP) 9R (13:271).

In Appendix G, the words, Standard vs Omitted, appearing beside an entry header indicates all the regressions in the paragraph were performed using the same data source for each independent variable in the two regressions compared. The difference is that one regression included all cases in the model, and the second one omitted the most influential outlier identified by the first regression of the model using the procedure described above. Entry five, for example, uses the same basic model representation as entry one. The only difference is that for each regression of entry five, the most influential case identified by the regressions of entry one were eliminated. None of the comparisons of entry five resulted in the conclusion that there was any discernible difference between the regression of a model representation with all cases included, and the regression of the same representation with the most influential case omitted. Hence no sensitivity for the model representation to outliers is identified. The reader is referred to Appendix G for a more complete set of results.

In summary, sixteen of the 139 comparison tests made have been excluded from the appendix due to errors made in setting up the necessary regressions for computer analysis. Very few of the

comparisons resulted in the rejection of the null hypothesis. In fact only one other rejection besides the two noted above was noted.

Economic Value of Data

Many comparisons are possible between regressions run with FTC and Census data. In fact, over 190 regressions were run during the course of this thesis in order to set up the tests just previously discussed. These tests addressed the question of differences between the response equations when using the two data bases to address one of the four models. The following discussion will center upon a very small fraction of the regression outcomes to get a flavor of the merit and potential for FTC data when addressing the profit-structure questions.

This analysis will be confined to the values of the data bases which are averaged over the years 1975 and 1976 where possible, in order to smooth short run fluctuations. All regressions will be derived from the four basic models previously discussed.

The first set of regressions to be discussed are depicted in Table 3.3. This table compares some of the results of this study to results from the work of Kwoka (19) and Allen (2). In the three comparisons shown in the table, the study regressions consistently indicate a better fit of the data to the model (in the form of a higher $\bar{R}^2$) than do the results of the previous works. The study results; however, indicate the Dispersion index (Disp), the

Table 3.3: Correlation Matrix

	I	C_4	Disp	KO7576	KOftc7576	LBASS7576	AdvrToSa	LBADV7576
I	1.0000							
C_4	.8399	1.0000						
Disp	.1614	.2596	1.0000					
KO7576	.0900	.2406	.0546	1.0000				
KOftc7576	.1072	.3040	.2053	.7560	1.0000			
LBASS7576	.1308	.2831	.2514	.6690	.9351	1.0000		
AdvrToSa	.1742	.1994	.2115	-.1403	-.1093	-.0706	1.0000	
LBADV7576	.1799	.1859	.0459	-.2120	-.1964	-.0924	.8268	1.0000
GROW	.0080	.0078	.0389	.1463	.0375	.0422	.0162	.0110
MCDR	.1619	.2267	.4468	-.0191	.0774	.0924	.2384	.1590
CAR	.4091	.4517	.1798	.0503	.2182	.3029	.3089	.3582
LBRD7576	.0400	.0890	.0984	.0702	.0668	.1807	-.1643	-.1974
CPCM7576	.2300	.2433	-.0552	.2887	.0534	.1181	.4265	.4225
LBOPI7576	.2471	.1944	-.0040	.1148	-.0203	.0291	.3419	.3135
INDPCM7576	.0394	.0172	-.1863	.3326	-.0205	-.0262	.1544	.1345

	GROW	MCDR	CAR	LBRD7576	CPCM7576	LBOPI7576	INDPCM7576
GROW	1.0000						
MCDR	-.1119	1.0000					
CAR	-.0825	.3156	1.0000				
LBRD7576	.1244	.2480	-.0390	1.0000			
CPCM7576	.2653	-.0550	.3903	.0999	1.0000		
LBOPI7576	.3647	-.0025	.3066	-.0171	.6436	1.0000	
INDPCM7576	.3856	-.2931	.1768	-.1895	.8569	.6030	1.0000

Capital-Output ratio (KO7576), and the measure of the presence of efficiency barriers (MCDR) to be insignificant, whereas Kwoka showed just the opposite was true. In the two comparisons with Allen's work, the study showed both the four firm concentration ratio (C_4) and the Strategic Group Concentration ratio (I) to be insignificant, whereas Allen showed the opposite. In addition, the study showed the GROW variable to be positive and significant whereas Allen showed the variable to be negative and insignificant.

Such results do not necessarily indicate the data base for this study was in error. Both Allen and Kwoka used 1972 Census data. This study used 1977 Census data. One possible explanation for the differences noted above is that wage and price controls which were in effect in 1972 could have led to severe distortion in the economic figures. A high rate of inflation occurring during 1977 could have caused other disruptions in those figures. Both a positive and negative sign on the GROW variable have economic interpretations which are tied closely to either expansions or contractions in the economy.

Table 3.4 shows some additional regressions. They were each run with either all Census data or with as many variables derived from FTC data as was possible. A regression run with a dependent variable of CPCM7576 identifies one of the former type, while a dependent variable of LBOPI7576 identifies one of the latter type. Two regressions are displayed for each model definition. The second regression of the pair differs from the first only in that the most

Table 3.4: Sample Regression Results

Dependent Variable	1	Dtax	KD 7576	KDRc 7576	AdvrTo 7576	LBADV 7576	GRDvt	MCDR	CAR	LBRD	R^2	F	Cases	Ellipse
Model 1														
CPCH7576	.1152[c]	-.0448[c]	.8877[b]		1.3261[a]		.8527[a]				.2450	7.30	69	1.77
CPCH7576	.1275[c]	-.8561[b]	.8946[b]		1.3758[a]		.8484[a]				.2432	7.17	44	1.98
LBRP17576	.1198[b]	-.8100		.8018		.6854[a]	.8484[a]				.2160	6.46	51	48.26
LBRP17576	.1388[a]	-.8241		-.8019		.2898	.8516[a]				.1883	5.55	45	3.75
Model 2														
CPCH7576	.1049[a]	-.8315	.8735[c]		1.3364[a]		.8357[c]	-.3653			.2399	5.47	69	4.50
CPCH7576	.2888[a]	-.8488[c]	.8883[b]		1.3896		.8169[a]	-.2988			.2521	5.72	111	2.23
LBRP17576	.1279[b]	-.8072		-.8889		.7149[a]	.8481[a]	.8127			.2215	5.88	51	46.10
LBRP17576	.1488[a]	-.8188		-.8841		.2553	.8508[a]	-.1127			.1798	4.11	111	46.19
Model 3														
CPCH7576	.8912	-.8495[b]	.8748[b]		1.8842[a]		.8568[a]		.8412[a]		.3158	8.38	45	7.68
CPCH7576	.8668	-.8258	.8887[b]		.9028[a]		.8518[a]		.8534[a]		.3488	9.15	47	1.68
LBRP17576	.8574	-.8129		-.8122		.3875	.8528[a]		.8481[a]		.2848	7.48	51	38.42
LBRP17576	.8727	-.8254		-.8146		-.8150	.8545		.8568		.2499	6.39	45	8.28
Model 4														
CPCH7576	.8471	-.8508[b]	.8728[b]		1.8637[c]		.8514[a]			.7998[c]	.2838	4.74	68	2.33
CPCH7576	.8638	-.8657[a]	.8794[b]		1.1321[b]		.8368[b]			.9239[b]	.2881	4.74	91	2.68
LBRP17576	.1123[b]	-.8552[b]		-.8884		.1714	.8538[a]			-.8299	.1982	4.56	98	1.96
LBDP17576	.1122[b]	-.8551[b]		-.8833		.1475	.8534[a]			-.3758	.2819	4.79	45	1.15

Significance levels of the coefficients (two-tail test) are:
a. 1% level,
b. 5% level,
c. 10% level.

influential case, according to Cook's distance, for the first regression was eliminated from the second.

The definition of Cook's distance coincides most closely to the definition of a joint confidence region (33:89). The deletion of the case with the largest Cook's distance will cause a change in the joint confidence interval for the coefficients. If the edge of this interval, as represented in two dimensions by an ellipse, changes by more than 50%, the case is considered influential, whereas a movement of only 20% is considered small (33:108). The percentage change is identified for the regressions in Table 3.4 under the column labeled, Ellipse. The ellipse values for the second entry, for example, are 48.26 and 3.75 corresponding to the first and second regressions in the pair respectively. The first value, 48.26 is quite large and indicates deletion of the most influential case will result in some drastic changes in both the magnitude and significance of one or more coefficients in the regression. The second value, 3.75, indicates stability in the regression and that omission of the next most influential case will result in only small changes in the regression coefficients and their relative significances.

The values of $\bar{R}^2$ are consistently higher for the pure Census based regressions than for those using the FTC variables. The capital-output measure formed from FTC data (KOftc7576) provides a consistently lower coefficient and significance, usually with the wrong sign, than when it is formed from Census data.

The addition of MCDR in model two caused the significance and

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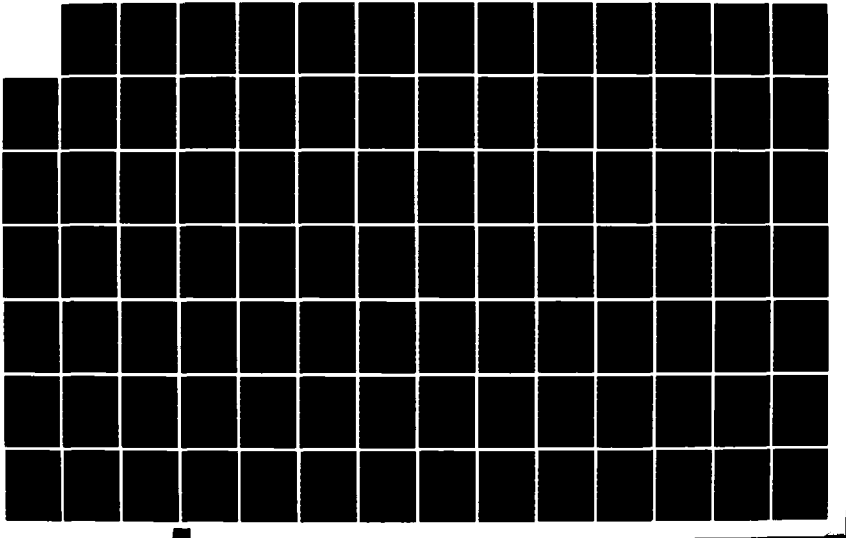

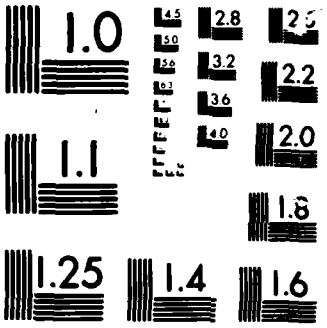

MICROCOPY CHART

contribution of the strategic group concentration to rival that obtained by Allen (2:938). The significance of MCDR was minute, though it should be pointed out that MCDR and Disp are moderately correlated (see Table 3.2) thus confounding their respective contributions. The significance of this result is lessened in that the addition of MCDR contributed little to the overall fit of the model to the data.

The use of CAR in model three brought about a dramatic jump in $\bar{R}^2$ which increased from .25 for model one to .34 when the influential outlier was omitted. It is interesting to note that the direction of movement in significance and contribution for each of the common independent variables was the same for this analysis and that of Allen's regression 1d (see Chapter 2, Table 2.6). At the same time, however, the magnitude of the change for concentration was much greater for this study leaving it insignificant. Again collinearity between the independent variables may be responsible. CAR is highly correlated with both concentration and advertising intensity. Allen's results agree with the former but not with the latter probably because his use of an indicator variable for advertising intensity broke the correlation. The correlation between I and CAR exceeds 0.4 for this study while Allen reported a correlation of about 0.3 (2:937).

The final regressions considered in Table 3.4 capture the effect of adding information heretofore unavailable for profitability studies. Namely the amount of out of pocket money which a company

chooses to spend on research and development for a particular LOB. This would be another barrier to entry variable. When regressed against the Census dependent variable, research and development expense (LBRD) was significant but concentration was not. When regressed against the FTC dependent variable, LBRD, advertising intensity, and capital intensity were insignificant but concentration became significant. Correlation was low between LBRD and all of the other variables.

The inconsistent results between the regressions using LBOPI7576 and those using CPCM7576 of Table 3.4 may be indicative of a specification error in one or more of the variables employed in the model. Table 3.5 lists a series of regressions for model one in which only the source of the three common variables are varied. Again, the coefficient of the Capital-Output variable was usually small whenever the FTC data base was used for its derivation (see regressions 5c, 5k, 5l). It also became small using the Census data base derivation of Capital-Output when using the FTC dependent variable (see regression 5i and 5j). Given this observation and that the definitions were consistent for both the capital-output measure and the advertising to sales measure between the two data bases it seems possible that the FTC dependent variable definition may have been in error. Consider again the following definitions of the dependent variables:

Table 3.5: Specification Errors

Study's Results:

Dependent Variable	I	Disp	KO 7576	KOftc 7576	Advr/ Sales	LBADV 7576	GROW	R^2
5a CPCM7576	.1152[b]	-.0448[c]	.0877[b]	.****	1.3261[a]	.****	.0527[a]	.2450
5b CPCM7576	.1275[b]	-.0561[b]	.0946[b]	.****	1.3758[a]	.****	.0404[b]	.2432
5c CPCM7576	.1381[b]	-.0390	.****	-.0046	1.1731[a]	.****	.0572[a]	.1959
5d CPCM7576	.1217[c]	-.0250	.****	.0319	1.1601[a]	.****	.0508[a]	.1891
5e CPCM7576	.0739	-.0344	.1361[a]	.****	.****	1.5800[a]	.0518[a]	.3463
5f CPCM7576	.0868	-.0458[b]	.1418[a]	.****	.****	1.6293[a]	.0379[b]	.3526
5g CPCM7576	.1060	-.0392	.****	.0302	.****	1.3262[a]	.0596[a]	.2185
5h CPCM7576	.0843	-.0184	.****	.0713[a]	.****	1.3872[a]	.0511[a]	.2587
5i LBOPI7576	.1286[a]	-.0247	.0120	.****	.8906[a]	.****	.0477[a]	.2493
5j LBOPI7576	.1325[a]	-.0308[c]	.0046	.****	.1755	.****	.0513[a]	.1916
5k LBOPI7576	.1198[b]	-.0100	.****	.0018	.****	.6854[a]	.0494[a]	.2160
5l LBOPI7576	.1300[a]	-.0241	.****	-.0019	.****	.2098	.0516[a]	.1883

Allen's Result:

Dependent Variable	I	Disp	KO 7576	KOftc 7576	CDUM	LBADV 7576	GROW	R^2
PCM	.2640[a]	-.0360[b]	.0880[a]	.****	2.5580[b]	.****	-.0110	.1250

CPCM = (VAdd - Payroll)/VShip

*LBOPI = (Sales - materials - payrolls - advertising - other selling expenses - G & A - depreciation)

Significance levels are: a. 1%, b. 5%, c. 10%.

$$CPCM = (VAdd - Payroll)/VShip \quad (3.4)$$

$$LBOPI = (Sales - materials - payrolls - advertising - other\ selling\ expenses - G\ \&\ A - depreciation) \quad (3.5)$$

Equation (3.4) is the Census definition and equation (3.5) is the FTC definition. Note that none of the variables used to construct the Census definition have been used as independent variables in any of the four models. This is not true for the FTC dependent variable for at least two independent variables have been used in its derivation. First, advertising to sales is used directly. Second, capital output is present in the guise of the depreciation variable since they are assumed to be highly correlated. This correlation stems from the fact that as an industry accumulates more capital the total amount of depreciation it takes on its accumulated capital will also increase.

Besides the possibility of a specification error, it may also be that some of the inconsistency in results arise from collinearity between the variables. There appears to be many statistically significant interactions involving some of the variables as discussed above. One of the procedures which can be used to break up collinearity involves increasing the number of observations made on the population (23:394). The comparisons made using the F test suggest there is little difference between two regressions when one or more of their independent variables differ in their data source. This

result infers that the data from both the Census and FTC data bases can be pooled.

The results of some of the possible regressions using this pooling technique can be seen in Tables 3.6 and 3.7. Table 3.6 regressions use only the Census dependent variable (CPCM). These regression are robust in the sense that a majority of the coefficients are significant. The goodness of fit for regression 6j is one of the best noted in all the work accomplished for this thesis. The results of Table 3.7 are much less robust. In fact the Capital-Output ratio is never significant when using the FTC dependent variable. This evidence further indicates a need to look carefully at the structure of the FTC dependent variable for possible alterations.

Table 3.6: Census Pooled Runs

Study's Results:

Dependent Variable	I	Disp	KO 7576	KO Pool	Advr Sales	Advr Pool	GROW	CAR	R^2	Ellipse
6a CPCM7576	.1152[b]	-.0448[c]	.0877[b]	.****	1.3261[a]	.****	.0527[a]		.2450	1.77
6b CPCM7576	.1275[b]	-.0561[b]	.0946[b]	.****	1.3758[a]	.****	.0404[b]		.2432	1.90
6c CPCM7576	.1304[a]	-.0426[b]	.****	.0170	1.2267[a]	.****	.0572[a]		.2227	31.95
6d CPCM7576	.1244[a]	-.0393[b]	.****	.0499[b]	1.2498[a]	.****	.0478[a]		.2277	.25
6e CPCM7576	.0968[b]	-.0403[a]	.1133[a]	.****	.****	1.4114[a]	.0520[a]		.3086	.34
6f CPCM7576	.1094[b]	-.0516[a]	.1194[a]	.****	.****	1.4596[a]	.0390[a]		.3109	.25
6g CPCM7576	.1155[b]	-.0408[b]	.****	.0360[b]	.****	1.2668[a]	.0577[a]		.2394	39.28
6h CPCM7576	.1088[b]	-.0351[b]	.****	.0684[a]	.****	1.2934[a]	.0477[a]		.2590	.82
6i CPCM7576	.1116[b]	-.0459[a]	.0046	.****	.9787	.****	.0598[a]	.0410[a]	.3026	44.60
6j CPCM7576	.0775[c]	-.0242	.0348[c]	.****	.8552[a]	.****	.0532[a]	.0525[a]	.4306	.08
6k CPCM7576	.0766	-.0454[a]	.0990[a]	.****	.****	1.1202[a]	.0544[a]	.0393[a]	.3621	.82
6l CPCM7576	.0540	-.0230	.0930[a]	.****	.****	.9427[a]	.0497[a]	.0522[a]	.3843	.45
6m CPCM7576	.1020[b]	-.0446[a]	.****	.0231	.****	.9689[a]	.0591[a]	.0390[a]	.2998	49.58
6n CPCM7576	.0674	-.0215	.****	.0522[a]	.****	.8530[a]	.0517[a]	.0515[a]	.3505	.81

Allen's Result:

Dependent Variable	I	Disp	KO 7576	KOftc 7576	CDUM	LBADV 7576	GROW	R^2
PCM	.2640[a]	-.0360[b]	.0880[a]	.****	2.5580[b]	.****	-.0110	.1250

Significance levels are: a. 1%, b. 5%, c. 10%.

Table 3.7: FTC Pooled Runs

Study's Results:

Dependent Variable	⊥	Disp	KOftc 7576	KO Pool	LBADV 7576	Advr Pool	GROW	CAR	R^2	Ellipse
7a LBOPI7576	.1198[a]	-.0100	.0018	.****	.6854[a]	.****	.0494[a]		.2160	3.24
7b LBOPI7576	.1300[a]	-.0241	-.0019	.****	.2098	.****	.0516[a]		.1883	.46

Dependent Variable	⊥	Disp	KO 7576	KO Pool	Advr Sales	Advr Pool	GROW	CAR	R^2	Ellipse
7c LBOPI7576	.1310[a]	-.0205	.****	.0043	.8548[a]	.****	.0499[a]		.2711	3.24
7d LBOPI7576	.1345[a]	-.0269[b]	.****	.0080	.1200	.****	.0532[a]		.2177	.46
7e LBOPI7576	.1204[a]	-.0195[c]	.0233	.****	.****	.7910[a]	.0461[a]		.2506	5.20
7f LBOPI7576	.1288[a]	-.0305[b]	.0154	.****	.****	.2321	.0493[a]		.2111	.10
7g LBOPI7576	.1243[a]	-.0161	.****	.0023	.****	.7495[a]	.0489[a]		.2482	6.12
7h LBOPI7576	.1317[a]	-.0275[b]	.****	-.0009	.****	.1858	.0517[a]		.2110	1.02
7i LBOPI7576	.0724[b]	-.0229[b]	.****	-.0110	.6743[a]	.****	.0546[a]	.0324[a]	.3220	2.26
7j LBOPI7576	.0791[a]	-.0282[b]	.****	-.0136	.0560	.****	.0572[a]	.0299[a]	.2645	1.21
7k LBOPI7576	.0590	-.0235[b]	.0208	.****	.****	.6100[a]	.0503[a]	.0328[a]	.3028	1.50
7l LBOPI7576	.0727[b]	-.0328[a]	.0139	.****	.****	.1340	.0527[a]	.0293[a]	.2568	.07
7m LBOPI7576	.0637[c]	-.0195[c]	.****	-.0053	.****	.5456[a]	.0532[a]	.0345[a]	.3048	3.80
7n LBOPI7576	.0761[b]	-.0293[b]	.****	-.0074	.****	.0655	.0552[a]	.0314[a]	.2613	2.18

Allen's Result:

Dependent Variable	⊥	Disp	KO 7576	KOftc 7576	LBADV CDUM	LBADV 7576	GROW	R^2
PCM	.2640[a]	-.0360[b]	.0880[a]	.****	2.5580[b]	.****	-.0110	.1250

Significance levels are: a. 1%, b. 5%, c. 10%.

IV. Results and Recommendations

This chapter is divided into two sections. The first offers the major findings of this effort. The second offers some suggestions for further research.

Major Findings

The results of the foregoing analysis seem to indicate that the ability of FTC and Census data to explain the profitability of an industry or LOB are remarkably similar. The general F test discussed in Chapter 3 showed conclusively that the outcome of a regression remains relatively stable over a wide range of adjustments in the four models.

The comparisons drawn between the previous work of Allen (2) and a sample of the regressions performed in the course of this study showed that certain elements of the FTC data set can provide similar results to those reported in previous work which used Census data exclusively.

The interpretation of some of the coefficients of the regressions was made difficult by the presence of slight to moderate collinearity between the independent variables. This suggested at least one use of FTC data. Should the correlation between one Census variable and another be high, and at least one of the variables has an FTC counterpart, then it may be possible to reduce the overall

collinearity of the model by using FTC data for the one variable rather than Census data.

Under certain conditions, the analyst may pool the two data sets to increase the robustness of the regression results.

The possible misspecification of the FTC dependent variable was noted.

Recommendations for Further Study

1. Testing for the equivalence of regressions which have the same independent variables but use different dependent variables.

2. The addition of other FTC variables not considered in this study but which are included in the data base.

3. The use of an alternative Line of Business capital output measure in lieu of the one used in this study.

4. Conduct similar analyses of the four different models using either Ravenscraft's Price-Cost-Margin (INDPCM) or some other specification of the same variable.

5. Combine the forthcoming 1977 FTC database with the current one and perform a similar analysis of the data with three year averages.

6. Investigate the results of the model when the data is cut into declining and increasing cost industries.

APPENDIX A: Census Enter

```
      program CensusData
      IMPLICIT NONE
      integer SIC,NCO,EST1to4,EST5to9,EST10to19,EST20to49
      integer EST50to99,EST100to249,EST250to499,EST500to999
      integer EST1000to2499,EST2500orMore,Item
      double precision Employees1thru4,Employees5thru8
      double precision Payroll75,Payroll76,VAdd75,VAdd76
      double precision VShip75,VShip76,GBVFA75,GBVFA76
      double precision VShip1thru4,VShip5thru8,Adver
      double precision VAdd76,VAdd75,VAdd1thru4,VAdd5thru8
      double precision Exports,Imports,VShip1to4,VShip5to9
      double precision VShip10to19,VShip20to49
      double precision VShip50to99,VShip250to499,VShip500to999
      double precision VShip1000to2499,VShip2500orMore
      double precision VShip100to249
      character CharIn*1
      OPEN(1,FILE='CENSUS',STATUS='OLD',ACCESS='SEQUENTIAL',
     -  FORM='FORMATTED',POSITION='APPEND',
     -  ACTION='WRITE')
1     SIC = 0
      NCO = 0
      VShip1thru4 = 0.0
      VShip5thru8 = 0.0
      VAdd1thru4 = 0.0
      VAdd5thru8 = 0.0
      EST1to4 = 0
      EST5to9 = 0
      EST10to19 = 0
      EST20to49 = 0
      EST50to99 = 0
      EST100to249 = 0
      EST250to499 = 0
      EST500to999 = 0
      EST1000to2499 = 0
      EST2500orMore = 0
      VShip1to4 = 0.0
      VShip5to9 = 0.0
      VShip10to19 = 0.0
      VShip20to49 = 0.0
      VShip50to99 = 0.0
      VShip100to249 = 0.0
      VShip250to499 = 0.0
      VShip500to999 = 0.0
      VShip1000to2499 = 0.0
```

```
VShip2500orMore = 0.0
Imports = 0.0
Exports = 0.0
Adver = 0.0
Payroll76 = 0.0
Payroll75 = 0.0
VAdd76 = 0.0
VAdd75 = 0.0
VShip76 = 0.0
VShip75 = 0.0
GBVFA76 = 0.0
GBVFA75 = 0.0
Item = 0
write(*,*) 'Please enter the four digit SIC code (1): '
read(*,*) SIC
write(*,*) 'Please enter Number of Companies: '
read(*,*) NCO
write(*,*) 'Please enter Payroll for 1976: '
read(*,*) Payroll76
write(*,*) 'Please enter Payroll for 1975: '
read(*,*) Payroll75
write(*,*) 'Please enter Value Added by Manufacture for 1976:'
read(*,*) VAdd76
write(*,*) 'Please enter Value Added by Manufacture for 1975:'
read(*,*) VAdd75
write(*,*) 'Please enter Value of Shipments for 1976: '
read(*,*) VShip76
write(*,*) 'Please enter Value of Shipments for 1975: '
read(*,*) VShip75
write(*,*) 'Please enter Gross Value of Fixed Assets for 1976:'
read(*,*) GBVFA76
write(*,*) 'Please enter Gross Value of Fixed Assets for 1975:'
read(*,*) GBVFA75
write(*,*) 'Please enter Value of Shipments for the 4'
write(*,*) 'largest companies (2): '
read(*,*) VShip1thru4
write(*,*) 'Please enter Value of Shipments for the next 4'
write(*,*) 'largest companies: '
read(*,*) VShip5thru8
write(*,*) 'Please enter Number of Employees for the 4'
write(*,*) 'largest companies: '
read(*,*) Employees1thru4
write(*,*) 'Please enter Number of Employees for the next 4'
write(*,*) 'largest companies: '
read(*,*) Employees5thru8
write(*,*) 'Please enter Value Added by manufacture for the 4'
write(*,*) 'largest companies: '
read(*,*) VAdd1thru4
```

```
write(*,*) 'Please enter Value Added by manufacture for the'
write(*,*) 'next 4 largest companies: '
read(*,*) VAdd5thru8
write(*,*) 'Please enter Advertising Input into the Industry'
write(*,*) 'located at row 73.0200 of Input-Output Table (4): '
read(*,*) Adver
write(*,*) 'Please enter Exports for industry located in column'
write(*,*) '94.0000 of Input-Output Table (3): '
read(*,*) Exports
write(*,*) 'Please enter Imports for industry located in column'
write(*,*) '95.0000 of Input-Output Table (3): '
read(*,*) Imports
write(*,*) 'Please enter the following Number of '
write(*,*) 'Establishments figures'
write(*,*) 'according to the number of employees (5): '
write(*,*) '1 to 4 employees: '
read(*,*) EST1to4
write(*,*) '5 to 9 employees: '
read(*,*) EST5to9
write(*,*) '10 to 19 employees: '
read(*,*) EST10to19
write(*,*) '20 to 49 employees: '
read(*,*) EST20to49
write(*,*) '50 to 99 employees: '
read(*,*) EST50to99
write(*,*) '100 to 249 employees: '
read(*,*) EST100to249
write(*,*) '250 to 499 employees: '
read(*,*) EST250to499
write(*,*) '500 to 999 employees: '
read(*,*) EST500to999
write(*,*) '1,000 to 2,499 employees: '
read(*,*) EST1000to2499
write(*,*) '2,500 employees or more: '
read(*,*) EST2500orMore
write(*,*) 'Please enter the following Value of Shipment'
write(*,*) 'figures according to the number of employees (5):'
write(*,*) '1 to 4 employees: '
read(*,*) VShip1to4
write(*,*) '5 to 9 employees: '
read(*,*) VShip5to9
write(*,*) '10 to 19 employees: '
read(*,*) VShip10to19
write(*,*) '20 to 49 employees: '
read(*,*) VShip20to49
write(*,*) '50 to 99 employees: '
read(*,*) VShip50to99
write(*,*) '100 to 249 employees: '
```

```
      read(*,*) VShip100to249
      write(*,*) '250 to 499 employees: '
      read(*,*) VShip250to499
      write(*,*) '500 to 999 employees: '
      read(*,*) VShip500to999
      write(*,*) '1,000 to 2,499 employees: '
      read(*,*) VShip1000to2499
      write(*,*) '2,500 employees or more: '
      read(*,*) VShip2500orMore
      write(*,*) '*****************************************************'
      write(*,*) 'You are now ready to validate the data.'
10    write(*,101) SIC
      write(*,102) NCO
      write(*,103) Payroll76
      write(*,104) Payroll75
      write(*,105) VAdd76
      write(*,106) VAdd75
      write(*,107) VShip76
      write(*,108) VShip75
      write(*,109) GBVFA76
      write(*,110) GBVFA75
101   format('(1) SIC code:                          ',I8)
102   format('(2) Number of Companies:               ',I8)
103   format('(3) Payroll for 1976:                  ',F8.2)
104   format('(4) Payroll for 1975:                  ',F8.2)
105   format('(5) Value Added by Manufacture 1976:   ',F8.2)
106   format('(6) Value Added by Manufacture 1975:   ',F8.2)
107   format('(7) Value of Shipments for 1976:       ',F8.2)
108   format('(8) Value of Shipments for 1975:       ',F8.2)
109   format('(9) Gross Value of Fixed Assets 1976:  ',F8.2)
110   format('(10) Gross Value of Fixed Assets 1975: ',F8.2)
      write(*,*)
      write(*,*) 'Are all of these values correct (Enter y or n): '
      read(*,'(A1)') CharIn
      IF(CharIn.ne.'Y').and.(CharIn.ne.'y') then
        write(*,*) 'Please enter the number of the item in error:'
        read(*,*) Item
        write(*,*) 'Please enter the new value: '
        IF(Item.eq.1) then
          read(*,*) SIC
        ELSEIF(Item.eq.2) then
          read(*,*) NCO
        ELSEIF(Item.eq.3) then
          read(*,*) Payroll76
        ELSEIF(Item.eq.4) then
          read(*,*) Payroll75
        ELSEIF(Item.eq.5) then
          read(*,*) VAdd76
```

```
            ELSEIF(Item.eq.6) then
              read(*,*) VAdd75
            ELSEIF(Item.eq.7) then
              read(*,*) VShip76
            ELSEIF(Item.eq.8) then
              read(*,*) VShip75
            ELSEIF(Item.eq.9) then
              read(*,*) GBVFA76
            ELSEIF(Item.eq.10) then
              read(*,*) GBVFA75
            ELSEIF(Item.lt.1).or.(Item.gt.10) then
              write(*,*) 'Invalid Item Number - Try Again'
            ENDIF
          goto 10
          ENDIF
20        write(*,*) '    Value of Shipments '
          write(*,111) VShip1thru4
          write(*,112) VShip5thru8
          write(*,*) '    Number of Employees'
          write(*,113) Employees1thru4
          write(*,114) Employees5thru8
          write(*,*) '    Value Added '
          write(*,115) VAdd1thru4
          write(*,116) VAdd5thru8
111       format('(1) 4 largest companies:       ',F8.2)
112       format('(2) Next 4 largest companies: ',F8.2)
113       format('(3) 4 largest companies:       ',F8.2)
114       format('(4) Next 4 largest companies: ',F8.2)
115       format('(5) 4 largest companies:       ',F8.2)
116       format('(6) Next 4 largest companies: ',F8.2)
          write(*,*)
          write(*,*) 'Are all of these values correct (Enter y or n): '
          read(*,'(A1)') CharIn
          IF(CharIn.ne.'Y').and.(CharIn.ne.'y') then
            write(*,*) 'Please enter the number of the item in error:'
            read(*,*) Item
            write(*,*) 'Please enter the new value: '
            IF(Item.eq.1) then
              read(*,*) VShip1thru4
            ELSEIF(Item.eq.2) then
              read(*,*) VShip5thru8
            ELSEIF(Item.eq.3) then
              read(*,*) Employees1thru4
            ELSEIF(Item.eq.4) then
              read(*,*) Employees5thru8
            ELSEIF(Item.eq.5) then
              read(*,*) VAdd1thru4
            ELSEIF(Item.eq.6) then
```

```
            read(*,*) VAdd5thru8
          ELSEIF(Item.lt.1).or.(Item.gt.6) then
            write(*,*) 'Invalid Item Number - Try Again'
          ENDIF
        goto 20
        ENDIF
30      write(*,*)
        write(*,117) Adver
        write(*,118) Exports
        write(*,119) Imports
117     format('(1) Advertising (row 73.0200): ',F8.2)
118     format('(2) Exports (column 94.0000):  ',F8.2)
119     format('(3) Imports (column 95.0000):  ',F8.2)
        write(*,*)
        write(*,*) 'Are all of these values correct (Enter y or n): '
        read(*,'(A1)') CharIn
        IF(CharIn.ne.'Y').and.(CharIn.ne.'y') then
          write(*,*) 'Please enter the number of the item in error:'
          read(*,*) Item
          write(*,*) 'Please enter the new value: '
          IF(Item.eq.1) then
            read(*,*) Adver
          ELSEIF(Item.eq.2) then
            read(*,*) Exports
          ELSEIF(Item.eq.3) then
            read(*,*) Imports
          ELSEIF(Item.lt.1).or.(Item.gt.3) then
            write(*,*) 'Invalid Item Number - Try Again'
          ENDIF
        goto 30
        ENDIF
        write(*,*)
40      write(*,*) 'Number of Establishments'
        write(*,120) EST1to4
        write(*,121) EST5to9
        write(*,122) EST10to19
        write(*,123) EST20to49
        write(*,124) EST50to99
        write(*,125) EST100to249
        write(*,126) EST250to499
        write(*,127) EST500to999
        write(*,128) EST1000to2499
        write(*,129) EST2500orMore
        write(*,*) 'Value of Shipments'
        write(*,130) VShip1to4
        write(*,131) VShip5to9
        write(*,132) VShip10to19
        write(*,133) VShip20to49
```

```
      write(*,134) VShip50to99
      write(*,135) VShip100to249
      write(*,136) VShip250to499
      write(*,137) VShip500to999
      write(*,138) VShip1000to2499
      write(*,139) VShip2500orMore
120   format('(1) 1 to 4 employees:              ',I8)
121   format('(2) 5 to 9 employees:              ',I8)
122   format('(3) 10 to 19 employees:            ',I8)
123   format('(4) 20 to 49 employees:            ',I8)
124   format('(5) 50 to 99 employees:            ',I8)
125   format('(6) 100 to 249 employees:          ',I8)
126   format('(7) 250 to 499 employees:          ',I8)
127   format('(8) 500 to 999 employees:          ',I8)
128   format('(9) 1000 to 2499 employees:        ',I8)
129   format('(10) 2,500 employees or more:      ',I8)
130   format('(11) 1 to 4 employees:            ',F8.2)
131   format('(12) 5 to 9 employees:            ',F8.2)
132   format('(13) 10 to 19 employees:          ',F8.2)
133   format('(14) 20 to 49 employees:          ',F8.2)
134   format('(15) 50 to 99 employees:          ',F8.2)
135   format('(16) 100 to 249 employees:        ',F8.2)
136   format('(17) 250 to 499 employees:        ',F8.2)
137   format('(18) 500 to 999 employees:        ',F8.2)
138   format('(19) 1000 to 2499 employees:      ',F8.2)
139   format('(20) 2,500 employees or more:     ',F8.2)
      write(*,*) 'Are all of these values correct (Enter y or n): '
      read(*,'(A1)') CharIn
      IF(CharIn.ne.'Y').and.(CharIn.ne.'y') then
        write(*,*) 'Please enter the number of the item in error:'
        read(*,*) Item
        write(*,*) 'Please enter the new value: '
        IF(Item.eq.1) then
          read(*,*) EST1to4
        ELSEIF(Item.eq.2) then
          read(*,*) EST5to9
        ELSEIF(Item.eq.3) then
          read(*,*) EST10to19
        ELSEIF(Item.eq.4) then
          read(*,*) EST20to49
        ELSEIF(Item.eq.5) then
          read(*,*) EST50to99
        ELSEIF(Item.eq.6) then
          read(*,*) EST100to249
        ELSEIF(Item.eq.7) then
          read(*,*) EST250to499
        ELSEIF(Item.eq.8) then
          read(*,*) EST500to999
```

```
      ELSEIF(Item.eq.9) then
        read(*,*) EST1000to2499
      ELSEIF(Item.eq.10) then
        read(*,*) EST2500orMore
      ELSEIF(Item.eq.11) then
        read(*,*) VShip1to4
      ELSEIF(Item.eq.12) then
        read(*,*) VShip5to9
      ELSEIF(Item.eq.13) then
        read(*,*) VShip10to19
      ELSEIF(Item.eq.14) then
        read(*,*) VShip20to49
      ELSEIF(Item.eq.15) then
        read(*,*) VShip50to99
      ELSEIF(Item.eq.16) then
        read(*,*) VShip100to249
      ELSEIF(Item.eq.17) then
        read(*,*) VShip250to499
      ELSEIF(Item.eq.18) then
        read(*,*) VShip500to999
      ELSEIF(Item.eq.19) then
        read(*,*) VShip1000to2499
      ELSEIF(Item.eq.20) then
        read(*,*) VShip2500orMore
      ELSEIF(Item.lt.1).or.(Item.gt.20) then
        write(*,*) 'Invalid Item Number - Try Again'
      ENDIF
    goto 40
    ENDIF
    write(*,*) 'Do you suspect an error in the record? (y or n):'
    read(*,'(A1)') CharIn
    IF(CharIn.eq.'Y').or.(CharIn.eq.'y') then
      write(*,*) 'Since you are unsure of an item entered '
      write(*,*) 'previously, you will now go to the top of '
      write(*,*) 'this record without losing any of the data you'
      write(*,*) 'have put in.'
      write(*,*) 'If you find an error, correct as before.'
      goto10
    ENDIF
    write(*,*) 'Storing Data'
    write(*,*)
    write(1,100) SIC,NCO,Payroll76,Payroll75,
     -    VAdd76,VAdd75,VShip76,VShip75,GBVFA76,GBVFA75,
     -    VShip1thru4,VShip5thru8,Employees1thru4,Employees5thru8,
     -    VAdd1thru4,VAdd5thru8,Exports,Imports,Adver,
     -    EST1to4,EST5to9,EST10to19,EST20to49,EST50to99,EST100to249,
     -    EST250to499,EST500to999,EST1000to2499,EST2500orMore,
     -    VShip1to4,VShip5to9,VShip10to19,VShip20to49,VShip50to99,
```

```
     -       VShip100to249,VShip250to499,VShip500to999,VShip1000to2499,
     -       VShip2500orMore
100       format(I4,I5,4F8.1,/,2F9.1,2F8.1,/,2F7.1,2F5.1,2F6.1,/,
     -       2F10.1,F7.1,10I4,/,10F8.1)
          read(*,'(A1)') CharIn
          IF (CharIn.eq.'Y').or.(CharIn.eq.'y') then
            goto 1
          ENDIF
          stop
          end
```

APPENDIX B: FTC Enter

```
      program Enter Data
      IMPLICIT NONE
      double precision FTCCode,ParticipationRatio
      double precision CoverageRatio,DecimalValue
      double precision SpecializationRatio,PPEAcqd5,PPEAcqd5To10
      double precision PPEAcqd10To20,PPEAcqd20Plus
      double precision LeftSide,RightSide
      integer CensusCode1,CensusCode2,CensusCode3,CensusCode4
      integer CensusCode5,NumberCompanies,TotalSalesAndTransfers
      integer MediaAdvertisingExpenseTraceable
      integer OtherSellingExpenseTraceable
      integer GeneralAndAdminExpenseTraceable
      integer MediaAdvertisingExpenseNonTraceable
      integer OtherSellingExpenseNonTraceable
      integer GeneralAndAdminExpenseNonTraceable
      integer GrossPlantPropEquipTraceable
      integer InventoriesThisYearTraceable
      integer GrossPlantPropEquipNonTraceable
      integer InventoriesThisYearNonTraceable
      integer Payrolls,MaterialsUsed,CostOfCompanyRandD
      integer IntegerValue
      integer InventoriesLastYearTraceable
      integer InventoriesLastYearNonTraceable,ItemNumber
      integer OperatingIncome
      character CHARIN*1
      OPEN(1,FILE='FTC75',STATUS='OLD',ACCESS='SEQUENTIAL',
     -  FORM='FORMATTED',POSITION='APPEND',
     -  ACTION='WRITE')
1     FTCCode = 00.00
      ParticipationRatio = 0.0
      CoverageRatio = 0.0
      DecimalValue = 0.0
      SpecializationRatio = 0.0
      CensusCode1 = 0
      CensusCode2 = 0
      CensusCode3 = 0
      CensusCode4 = 0
      CensusCode5 = 0
      NumberCompanies = 0
      TotalSalesAndTransfers = 0
      MediaAdvertisingExpenseTraceable = 0
      OtherSellingExpenseTraceable = 0
      GeneralAndAdminExpenseTraceable = 0
      MediaAdvertisingExpenseNonTraceable = 0
      OtherSellingExpenseNonTraceable = 0
```

```
OtherSellingExpenseNonTraceable = 0
GeneralAndAdminExpenseNonTraceable = 0
GrossPlantPropEquipTraceable = 0
InventoriesThisYearTraceable = 0
GrossPlantPropEquipNonTraceable = 0
InventoriesThisYearNonTraceable = 0
Payrolls = 0
MaterialsUsed = 0
CostOfCompanyRandD = 0
LeftSide = 0
RightSide = 0
PPEAcqd5 = 0
PPEAcqd5To10 = 0
PPEAcqd10To20 = 0
PPEAcqd20Plus = 0
IntegerValue = 0
InventoriesLastYearTraceable = 0
InventoriesLastYearNonTraceable = 0
OperatingIncome = 0
ItemNumber = 0
write(*,*) 'Please enter the 4 digit FTC code (XX.XX): '
read(*,*) FTCCode
write(*,*) 'Please enter the primary CENSUS code: '
read(*,*) CensusCode1
write(*,*) 'Are there any more Census codes to enter (Y or N)'
read(*,'(A1)') CHARIN
if((CHARIN.EQ.'Y').OR.(CHARIN.EQ.'y')) then
  write(*,*) 'Please enter the second code:'
  read(*,*) CensusCode2
  write(*,*) 'Please enter the third code (Return if zero):'
  read(*,*) CensusCode3
  write(*,*) 'Please enter the fourth code (Return if zero):'
  read(*,*) CensusCode4
  write(*,*) 'Please enter the fifth code (Return if zero):'
  read(*,*) CensusCode5
endif
write(*,*) 'Please enter the number of companies:'
read(*,*) NumberCompanies
write(*,*) 'Please enter the Participation Ratio XXX.X'
read(*,*) ParticipationRatio
write(*,*) 'Please enter the Specialization Ratio XXX.X'
read(*,*) SpecializationRatio
write(*,*) 'Please enter the Coverage Ratio XXX.X'
read(*,*) CoverageRatio
write(*,*) 'Please enter Total Sales and Transfers'
write(*,*) '(Data item No.6):'
```

```
read(*,*) TotalSalesAndTransfers
write(*,*) 'Please enter Media Advertising Expense - '
write(*,*) 'Traceable (Data item No.9):'
read(*,*) MediaAdvertisingExpenseTraceable
write(*,*) 'Please enter Other Selling Expense - Traceable'
write(*,*) '(Data item No.10):'
read(*,*) OtherSellingExpenseTraceable
write(*,*) 'Please enter General And Admin. Expense -'
write(*,*) 'Traceable (Data item No.11):'
read(*,*) GeneralAndAdminExpenseTraceable
write(*,*) 'Please enter Media Advertising Expense - '
write(*,*) 'Non-Traceable (Data item No.14):'
read(*,*) MediaAdvertisingExpenseNonTraceable
write(*,*) 'Please enter Other Selling Expense - '
write(*,*) 'Non-Traceable (Data item No.15):'
read(*,*) OtherSellingExpenseNonTraceable
write(*,*) 'Please enter General And Admin. Expense - '
write(*,*) 'Non-Traceable (Data item No.16):'
read(*,*) GeneralAndAdminExpenseNonTraceable
write(*,*) 'Please enter OperatingIncome (Data item No.18):'
read(*,*) OperatingIncome
write(*,*) 'Please enter Gross Plant Property and Equipment -'
write(*,*) 'Traceable (Data item No.19):'
read(*,*) GrossPlantPropEquipTraceable
write(*,*) 'Please enter Inventories This Year - Traceable'
write(*,*) '(Data item No.22):'
read(*,*) InventoriesThisYearTraceable
write(*,*) 'Please enter Gross Plant Property and Equipment -'
write(*,*) 'Non-Traceable (Data item No.25):'
read(*,*) GrossPlantPropEquipNonTraceable
write(*,*) 'Inventories This Year Non-Traceable'
write(*,*) '(Data item No.28):'
read(*,*) InventoriesThisYearNonTraceable
write(*,*) 'Please enter Payrolls (Data item No.32):'
read(*,*) Payrolls
write(*,*) 'Please enter Materials Used (Data item No.33):'
read(*,*) MaterialsUsed
write(*,*) 'Please enter the Cost of Company R and D '
write(*,*) '(Data item No.37):'
read(*,*) CostOfCompanyRandD
write(*,*) 'Please enter the Plant Prop., and Equipment Acqd'
write(*,*) 'Last 5 years (Data item No.48) -Left hand value:'
read(*,*) LeftSide
write(*,*) '(Data item No.48) -Right hand value:'
read(*,*) RightSide
PPEAcqd5 = (LeftSide + RightSide)/2
```

```
      RightSide = 0.0
      LeftSide = 0.0
      write(*,*) 'Please enter the Plant Prop., and Equipment Acqd'
      write(*,*) '5 - 10 years ago (Data item No.49) ',
     -  '-Left hand value:'
      read(*,*) LeftSide
      write(*,*) '(Data item No.49) -Right hand value:'
      read(*,*) RightSide
      PPEAcqd5To10 = (LeftSide + RightSide)/2
      RightSide = 0.0
      LeftSide = 0.0
      write(*,*) 'Please enter the Plant Prop., and Equipment Acqd'
      write(*,*) '10 - 20 years ago (Data item No.50) ',
     -  '-Left hand value:'
      read(*,*) LeftSide
      write(*,*) '(Data item No.50) -Right hand value:'
      read(*,*) RightSide
      PPEAcqd10To20 = (LeftSide + RightSide)/2
      RightSide = 0.0
      LeftSide = 0.0
      write(*,*) 'Please enter the Plant Prop., and Equipment Acqd'
      write(*,*) '20 + years ago (Data item No.51) -Left hand value:'
      read(*,*) LeftSide
      write(*,*) '(Data item No.51) -Right hand value:'
      read(*,*) RightSide
      PPEAcqd20Plus = (LeftSide + RightSide)/2
      RightSide = 0.0
      LeftSide = 0.0
      write(*,*) 'Please enter Inventories Last Year - Traceable'
      write(*,*) 'Previous Year (Data item No.22):'
      read(*,*) InventoriesLastYearTraceable
      write(*,*) 'Please enter Inventories Last Year - '
      write(*,*) 'Non-Traceable Previous Year (Data item No.28):'
      read(*,*) InventoriesLastYearNonTraceable
100   write(*,*) '(1) FTC Code: ',FTCCode
      write(*,*) '(2) Participation Ratio: ',ParticipationRatio
      write(*,*) '(3) Specialization Ratio: ',SpecializationRatio
      write(*,*) '(4) CoverageRatio: ',CoverageRatio
      write(*,*) '(5) Census Code1: ',CensusCode1
      write(*,*) '(6) Census Code2: ',CensusCode2
      write(*,*) '(7) Census Code3: ',CensusCode3
      write(*,*) '(8) Census Code4: ',CensusCode4
      write(*,*) '(9) Census Code5: ',CensusCode5
      write(*,*) '(10) Number Companies: ',NumberCompanies
      write(*,*) '(11) Total Sales And Transfers: ',
     -  TotalSalesAndTransfers
```

```
      write(*,*) '(12) Media Advertising Expense - Traceable: ',
     -   MediaAdvertisingExpenseTraceable
      write(*,*) '(13) Other Selling Expense - Traceable: ',
     -   OtherSellingExpenseTraceable
      write(*,*) '(14) General And Admin Expense - Traceable: ',
     -   GeneralAndAdminExpenseTraceable
      write(*,*) '(15) Media Advertising Expense - NonTraceable: ',
     -   MediaAdvertisingExpenseNonTraceable
      write(*,*) '(16) Other Selling Expense - NonTraceable: ',
     -   OtherSellingExpenseNonTraceable
      write(*,*) '(17) General And Admin Expense - NonTraceable: ',
     -   GeneralAndAdminExpenseNonTraceable
      write(*,*) '(18) OperatingIncome: ',OperatingIncome
      write(*,*) 'Are any of these values in error? (Y or N)'
      read(*,'(A1)') CHARIN
      if((CHARIN.eq.'Y').or.(CHARIN.eq.'y')) then
        write(*,*) 'Please enter the number of the item in error: '
        read(*,*) ItemNumber
        write(*,*) 'New Data Value: '
        if(ItemNumber.le.4) then
          read(*,*) DecimalValue
        elseif(ItemNumber.gt.4) then
          read(*,*) IntegerValue
        endif
        if(ItemNumber.eq.1) then
          FTCCode = DecimalValue
        elseif(ItemNumber.eq.2) then
          ParticipationRatio = DecimalValue
        elseif(ItemNumber.eq.3) then
          SpecializationRatio = DecimalValue
        elseif(ItemNumber.eq.4) then
          CoverageRatio = DecimalValue
        elseif(ItemNumber.eq.5) then
          CensusCode1 = IntegerValue
        elseif(ItemNumber.eq.6) then
          CensusCode2 = IntegerValue
        elseif(ItemNumber.eq.7) then
          CensusCode3 = IntegerValue
        elseif(ItemNumber.eq.8) then
          CensusCode4 = IntegerValue
        elseif(ItemNumber.eq.9) then
          CensusCode5 = IntegerValue
        elseif(ItemNumber.eq.10) then
          NumberCompanies = IntegerValue
        elseif(ItemNumber.eq.11) then
          TotalSalesAndTransfers = IntegerValue
```

```
        elseif(ItemNumber.eq.12) then
          MediaAdvertisingExpenseTraceable = IntegerValue
        elseif(ItemNumber.eq.13) then
          OtherSellingExpenseTraceable = IntegerValue
        elseif(ItemNumber.eq.14) then
          GeneralAndAdminExpenseTraceable = IntegerValue
        elseif(ItemNumber.eq.15) then
          MediaAdvertisingExpenseNonTraceable = IntegerValue
        elseif(ItemNumber.eq.16) then
          OtherSellingExpenseNonTraceable = IntegerValue
        elseif(ItemNumber.eq.17) then
          GeneralAndAdminExpenseNonTraceable = IntegerValue
        elseif(ItemNumber.eq.18) then
          OperatingIncome = IntegerValue
        endif
        goto 100
      endif
200   write(*,*) '(19) Gross Plant Property and Equipment - ',
     -   'Traceable: ',GrossPlantPropEquipTraceable
      write(*,*) '(20) Inventories This Year: ',
     -   InventoriesThisYearTraceable
      write(*,*) '(21) Gross Plant Property and Equipment - ',
     -   'NonTraceable: ',GrossPlantPropEquipNonTraceable
      write(*,*) '(22) Inventories This Year - NonTraceable: ',
     -   InventoriesThisYearNonTraceable
      write(*,*) '(23) Payrolls: ',Payrolls
      write(*,*) '(24) Materials Used: ',MaterialsUsed
      write(*,*) '(25) Cost Of Company R and D: ',CostOfCompanyRandD
      write(*,*) '(26) Plant Prop., and Equipment Acqd',
     -   'Last 5 Years: ',PPEAcqd5
      write(*,*) '(27) Plant Prop., and Equipment Acqd',
     -   '5-10 Years Ago: ',PPEAcqd5To10
      write(*,*) '(28) Plant Prop., and Equipment Acqd 10-20 ',
     -   'Years Ago: ', PPEAcqd10To20
      write(*,*) '(29) Plant Prop., and Equipment Acqd ',
     -   '20 + Years Ago: ',PPEAcqd20Plus
      write(*,*) '(30) Inventories Last Year - Traceable',
     -   InventoriesLastYearTraceable
      write(*,*) '(31) Inventories Last Year - Non-Traceable',
     -   InventoriesLastYearNonTraceable
      write(*,*) 'Are any of these values in error? (Y or N)'
      read(*,'(A1)') CHARIN
      if((CHARIN.eq.'Y').or.(CHARIN.eq.'y')) then
        write(*,*) 'Please enter the number of the item in error: '
        read(*,*) ItemNumber
        write(*,*) 'New Data Value: '
```

```
            if(ItemNumber.le.25) then
              read(*,*) IntegerValue
            elseif(ItemNumber.gt.25).and.(ItemNumber.le.29) then
              read(*,*) DecimalValue
            elseif(ItemNumber.gt.29) then
              read(*,*) IntegerValue
            endif
            if(ItemNumber.eq.19) then
              GrossPlantPropEquipTraceable = IntegerValue
            elseif(ItemNumber.eq.20) then
              InventoriesThisYearTraceable = IntegerValue
            elseif(ItemNumber.eq.21) then
              GrossPlantPropEquipNonTraceable = IntegerValue
            elseif(ItemNumber.eq.22) then
              InventoriesThisYearNonTraceable = IntegerValue
            elseif(ItemNumber.eq.23) then
              Payrolls = IntegerValue
            elseif(ItemNumber.eq.24) then
              MaterialsUsed= IntegerValue
            elseif(ItemNumber.eq.25) then
              CostOfCompanyRandD = IntegerValue
            elseif(ItemNumber.eq.26) then
              PPEAcqd5 = DecimalValue
            elseif(ItemNumber.eq.27) then
              PPEAcqd5To10 = DecimalValue
            elseif(ItemNumber.eq.28) then
              PPEAcqd10To20 = DecimalValue
            elseif(ItemNumber.eq.29) then
              PPEAcqd20Plus = DecimalValue
            elseif(ItemNumber.eq.30) then
              InventoriesLastYearTraceable = IntegerValue
            elseif(ItemNumber.eq.31) then
              InventoriesLastYearNonTraceable = IntegerValue
            endif
            goto 200
          endif
*** OUTPUT RECORD TO FILE ***
          write(*,*) 'Outputting record to file'
          write(1,300) FTCCode,CensusCode1,CensusCode2,CensusCode3,
     -      CensusCode4,CensusCode5,NumberCompanies,ParticipationRatio,
     -      SpecializationRatio,CoverageRatio,TotalSalesAndTransfers,
     -      MediaAdvertisingExpenseTraceable,
     -      MediaAdvertisingExpenseNonTraceable,
     -      OtherSellingExpenseTraceable,
     -      OtherSellingExpenseNonTraceable,
     -      GeneralAndAdminExpenseTraceable,
```

```
     -       GeneralAndAdminExpenseNonTraceable,
     -       OperatingIncome,
     -       GrossPlantPropEquipTraceable,
     -       GrossPlantPropEquipNonTraceable,
     -       InventoriesThisYearTraceable,
     -       InventoriesThisYearNonTraceable,
     -       InventoriesLastYearTraceable,
     -       InventoriesLastYearNonTraceable,Payrolls,MaterialsUsed,
     -       CostOfCompanyRandD,PPEAcqd5,PPEAcqd5To10,PPEAcqd10To20,
     -       PPEAcqd20Plus
300       FORMAT(F5.2,5I5,I2,3F5.1,I9,/,7I7,/,7I8,I9,I8,/,4F4.1)
          read(*,'(A1)') CHARIN
          if((CHARIN.eq.'Y').or.(CHARIN.eq.'y')) then
            goto 1
          endif
          end
```

APPENDIX C: Census Build

```
      program CensusBuild
      IMPLICIT NONE
      integer SIC,NCO,EST1to4,EST5to9,EST10to19,EST20to49
      integer EST50to99,EST100to249,EST250to499,EST500to999
      integer EST1000to2499,EST2500orMore,Item,StartNumber
      integer FirstPass,TtlEstablishments,IncrementEst,Found
      double precision Employees1thru4,Employees5thru8
      double precision Payroll75,Payroll76,VAdd75,VAdd76
      double precision VShip75,VShip76,VShip77,VShip72
      double precision GBVFA75,GBVFA76,VShip1thru4,VShip5thru8
      double precision Adver,VAdd1thru4,VAdd5thru8
      double precision Exports,Imports,VShip1to4,VShip5to9
      double precision VShip10to19,VShip20to49
      double precision VShip50to99,VShip250to499,VShip500to999
      double precision VShip1000to2499,VShip2500orMore
      double precision VShip100to249
      double precision VAdd1to4,VAdd5to9
      double precision VAdd10to19,VAdd20to49
      double precision VAdd50to99,VAdd250to499,VAdd500to999
      double precision VAdd1000to2499,VAdd2500orMore
      double precision VAdd100to249
      double precision TtlVAdd,TtlNEmp
      double precision NEmp1to4,NEmp5to9
      double precision NEmp10to19,NEmp20to49
      double precision NEmp50to99,NEmp100to249,NEmp250to499
      double precision NEmp500to999,NEmp1000to2499,NEmp2500orMore
      double precision CtrVShip,RunVShip,RunVAdd,Fraction,Increment
      double precision UpperVAdd,LowerVAdd,UpperEmp,LowerEmp
      double precision MID,MES,CDR,CAR,I,C4,KO75,KO76,KO7576
      double precision AdvrToSales,GROW
      double precision CtrVAdd,Accum1
      double precision CPCM7576,CPCM75,CPCM76,Disp
      double precision ImportsToSales,ExportsToSales
      double precision MCDR,MESD20
      character CharIn*1,InputFILNAM*8
      WRITE(*,*) 'ENTER NAME (UP TO 8 CHARS) OF INPUT FILE'
      WRITE(*,*) 'YOU WISH TO BE PROCESSED.  '
      READ(*,'(A8)') InputFILNAM
      OPEN(1,FILE=InputFILNAM,STATUS='OLD',ACCESS='SEQUENTIAL',
     -   FORM='FORMATTED',POSITION='APPEND',
     -   ACTION='READ')
      OPEN(2,FILE='DataBase',STATUS='NEW',ACCESS='SEQUENTIAL',
     -   FORM='FORMATTED',
```

```
     -       ACTION='WRITE')
             REWIND(1)
             REWIND(2)
C       *** Initialization Section ***
 1           SIC = 0
             NCO = 0
             Disp = 0.0
             MCDR = 0.0
             MESD20 = 0.0
             VShip1thru4 = 0.0
             VShip5thru8 = 0.0
             VAdd1thru4 = 0.0
             VAdd5thru8 = 0.0
             Employees1thru4 = 0.0
             Employees5thru8 = 0.0
             EST1to4 = 0
             EST5to9 = 0
             EST10to19 = 0
             EST20to49 = 0
             EST50to99 = 0
             EST100to249 = 0
             EST250to499 = 0
             EST500to999 = 0
             EST1000to2499 = 0
             EST2500orMore = 0
             VShip1to4 = 0.0
             VShip5to9 = 0.0
             VShip10to19 = 0.0
             VShip20to49 = 0.0
             VShip50to99 = 0.0
             VShip100to249 = 0.0
             VShip250to499 = 0.0
             VShip500to999 = 0.0
             VShip1000to2499 = 0.0
             VShip2500orMore = 0.0
             VAdd1to4 = 0.0
             VAdd5to9 = 0.0
             VAdd10to19 = 0.0
             VAdd20to49 = 0.0
             VAdd50to99 = 0.0
             VAdd100to249 = 0.0
             VAdd250to499 = 0.0
             VAdd500to999 = 0.0
             VAdd1000to2499 = 0.0
             VAdd2500orMore = 0.0
             NEmp1to4 = 0.0
```

```
NEmp5to9 = 0.0
NEmp10to19 = 0.0
NEmp20to49 = 0.0
NEmp50to99 = 0.0
NEmp100to249 = 0.0
NEmp250to499 = 0.0
NEmp500to999 = 0.0
NEmp1000to2499 = 0.0
NEmp2500orMore = 0.0
Imports = 0.0
Exports = 0.0
Adver = 0.0
Payroll76 = 0.0
Payroll75 = 0.0
VAdd76 = 0.0
VAdd75 = 0.0
VShip77 = 0.0
VShip76 = 0.0
VShip75 = 0.0
VShip72 = 0.0
GBVFA76 = 0.0
GBVFA75 = 0.0
Item = 0
CtrVShip = 0.0
CtrVAdd = 0.0
TtlVAdd = 0.0
TtlEstablishments = 0
Accuml = 0.0
UpperEmp = 0.0
LowerEmp = 0.0
UpperVAdd = 0.0
LowerVAdd = 0.0
Increment = 0.0
IncrementEst = 0
MID = 0.0
MES = 0
CDR = 0
CAR = 0
I = 0
C4 = 0
KO75 = 0.0
KO76 = 0.0
KO7576 = 0.0
AdvrToSales = 0.0
ExportsToSales = 0.0
ImportsToSales = 0.0
```

```
      GROW = 0.0
      RunVAdd = 0.0
      RunVShip = 0.0
      Found = 0
      CPCM75 = 0.0
      CPCM76 = 0.0
      CPCM7576 = 0.0
C     *** Input Data Section ***
      read(1,100) SIC,Disp,NCO,Payroll76,Payroll75,
     -  VAdd76,VAdd75,VShip77,VShip76,VShip75,VShip72,
     -  GBVFA76,GBVFA75,
     -  VShip1thru4,VShip5thru8,Employees1thru4,Employees5thru8,
     -  VAdd1thru4,VAdd5thru8,Exports,Imports,Adver,
     -  EST1to4,EST5to9,EST10to19,EST20to49,EST50to99,EST100to249,
     -  EST250to499,EST500to999,EST1000to2499,EST2500orMore,
     -  VShip1to4,VShip5to9,VShip10to19,VShip20to49,VShip50to99,
     -  VShip100to249,VShip250to499,VShip500to999,VShip1000to2499,
     -  VShip2500orMore,
     -  VAdd1to4,VAdd5to9,VAdd10to19,VAdd20to49,VAdd50to99,
     -  VAdd100to249,VAdd250to499,VAdd500to999,VAdd1000to2499,
     -  VAdd2500orMore,
     -  NEmp1to4,NEmp5to9,NEmp10to19,NEmp20to49,NEmp50to99,
     -  NEmp100to249,NEmp250to499,NEmp500to999,NEmp1000to2499,
     -  NEmp2500orMore
100   format(I4,F9.4,I5,4F8.1,/,4F9.1,2F8.1,/,2F7.1,2F5.1,2F6.1,/,
     -  2F10.1,F7.1,10I5,/,10F8.1,/,10F8.1,/,10F6.1)
      IF(SIC.eq.0) goto 55
C     *** Calculate Price-Cost Margin ***
      IF(VAdd75.ne.999.0).and.(VAdd76.ne.999.0).and.
     -  (VShip75.ne.999.0).and.(VShip76.ne.999.0).and.
     -  (VShip75.ne.0.0).and.(VShip76.ne.0.0).and.
     -  (Payroll75.ne.999.0).and.
     -  (Payroll76.ne.999.0) then
        CPCM75 = (VAdd75-Payroll75)/VShip75
        CPCM76 = (VAdd76-Payroll76)/VShip76
        CPCM7576 = (CPCM75 + CPCM76)/2
      ELSE
        CPCM75 = 9999.0
        CPCM76 = 9999.0
        CPCM7576 = 9999.0
      ENDIF
C     *** Concentration ***
      IF(VShip1thru4.ne.999.0) then
        C4 = VShip1thru4*.01
      ELSE
        C4 = 9999.0
```

```
            ENDIF
C           *** Calculate Capital/Output Ratio ***
            IF(GBVFA75.ne.999.0).and.(GBVFA76.ne.999.0).and.
     -        (VShip75.ne.999.0).and.(VShip76.ne.999.0) then
              KO75 = GBVFA75/VShip75
              KO76 = GBVFA76/VShip76
              KO7576 = (KO75 + KO76)/2
            ELSE
              KO75 = 9999.0
              KO76 = 9999.0
              KO7576 = 9999.0
            ENDIF
C           *** Calculate Advertising/Sales Ratio ***
            IF(Adver.ne.999.0).and.(VShip77.ne.999.0) then
              AdvrToSales = Adver/VShip77
            ELSE
              AdvrToSales = 9999.0
            ENDIF
C           *** Calculate Exports/Sales Ratio ***
            IF(Exports.ne.999.0).and.(VShip77.ne.999.0) then
              ExportsToSales = Exports/VShip77
            ELSE
              ExportsToSales = 9999.0
            ENDIF
C           *** Calculate Imports/Sales Ratio ***
            IF(Imports.ne.999.0).and.(VShip77.ne.999.0) then
              ImportsToSales = Imports/VShip77
            ELSE
              ImportsToSales = 9999.0
            ENDIF
C           *** Calculate Percentage Growth ***
            IF((VShip77.ne.999.0).and.(VShip72.ne.999.0)) then
              GROW = (VShip77 - VShip72)/VShip72
            ELSE
              GROW = 9999.0
            ENDIF
C           *** Calculate Cost Advantage Ratio ***
            IF(VAdd1thru4.ne.999.0).and.
     -        (VAdd5thru8.ne.999.0).and.
     -        (Employees1thru4.ne.999.0).and.
     -        (Employees5thru8.ne.999.0).and.
     -        (Employees1thru4.ne.0).and.
     -        (Employees5thru8.ne.0) then
              CAR = (VAdd1thru4/Employees1thru4)/
     -          (VAdd5thru8/Employees5thru8)
            ELSE
```

```
          CAR = 9999.0
        ENDIF
C       *** Calculate Strategic Group Concentration ***
        IF(VShip1thru4.ne.999.0).and.
     -    (VShip5thru8.ne.999.0) then
          I = VShip1thru4/(VShip1thru4 + VShip5thru8)
        ELSE
          I = 9999.0
        ENDIF
C     *** Load Dispersion Index ***
        IF(Disp.eq.999.0) then
          Disp = 9999.0
        ENDIF
C       *** Efficiency variables ***
        IF(EST1to4.eq.999.0).and.(EST5to9.eq.999.0).and.
     -    (EST10to19.eq.999.0).and.(EST20to49.eq.999.0).and.
     -    (EST50to99.eq.999.0).and.(EST100to249.eq.999.0).and.
     -    (EST250to499.eq.999.0).and.
     -    (EST500to999.eq.999.0).and.
     -    (EST1000to2499.ne.999.0).and.
     -    (EST2500orMore.eq.999.0) then
          MID = 9999.0
          MES = 9999.0
          CDR = 9999.0
          MCDR = 9999.0
          MESD20 = 0.0
          goto 80
        ENDIF
        IF((VShip1to4.eq.999.0).and.(VShip5to9.eq.999.0)).or.
     -    ((VShip5to9.eq.999.0).and.(VShip10to19.eq.999.0)).or.
     -    ((VShip10to19.eq.999.0).and.(VShip20to49.eq.999.0)).or.
     -    ((VShip20to49.eq.999.0).and.(VShip50to99.eq.999.0)).or.
     -    ((VShip50to99.eq.999.0).and.(VShip100to249.eq.999.0)).or.
     -    ((VShip100to249.eq.999.0).and.(VShip250to499.eq.999.0)).or.
     -    ((VShip250to499.eq.999.0).and.(VShip500to999.eq.999.0)).or.
     -    ((VShip500to999.eq.999.0).and.(VShip1000to2499.eq.999.0)).or.
     -    ((VShip1000to2499.eq.999.0).and.
     -    (VShip2500orMore.eq.999.0)) then
          Accuml = 0
          MID = 9999.0
          MES = 9999.0
          goto 75
        ENDIF
        IF(VShip77.eq.999.0) then
          MID = 9999.0
          MES = 9999.0
```

```
          goto 75
        ENDIF
        CtrVShip = VShip77/2
        TtlEstablishments =  EST1to4 + EST5to9 + EST10to19 +
     -    EST20to49 + EST50to99 + EST100to249 +
     -    EST250to499 + EST500to999 + EST1000to2499 + EST2500orMore
C
        IF(VShip1to4.ne.999.0) then
          RunVShip = VShip1to4
          IF(CtrVShip.le.RunVShip) then
            Found = 1
            IF(VShip5to9.eq.999.0) then
              MID = VShip1to4/(EST1to4 + EST5to9)
            ELSE
              MID = VShip1to4/EST1to4
            ENDIF
            RunVShip = 0
            goto 10
          ENDIF
        ENDIF
C
        IF(VShip5to9.ne.999.0) then
          RunVShip = RunVShip + VShip5to9
          IF(CtrVShip.le.RunVShip) then
            Found = 2
            IF(VShip10to19.eq.999.0) then
              MID = VShip5to9/(EST5to9 + EST10to19)
            ELSE
              MID = VShip5to9/EST5to9
            ENDIF
            RunVShip = RunVShip - VShip5to9
            goto 10
          ENDIF
        ENDIF
C
        IF(VShip10to19.ne.999.0) then
          RunVShip = RunVShip + VShip10to19
          IF(CtrVShip.le.RunVShip) then
            Found = 3
            IF(VShip20to49.eq.999.0) then
              MID = VShip10to19/(EST10to19 + EST20to49)
            ELSE
              MID = VShip10to19/EST10to19
            ENDIF
            RunVShip = RunVShip - VShip10to19
            goto 10
```

```
          ENDIF
        ENDIF
C
        IF(VShip20to49.ne.999.0) then
          RunVShip = RunVShip + VShip20to49
          IF(CtrVShip.le.RunVShip) then
            Found = 4
            IF(VShip50to99.eq.999.0) then
              MID = VShip20to49/(EST20to49 + EST50to99)
            ELSE
              MID = VShip20to49/EST20to49
            ENDIF
            RunVShip = RunVShip - VShip20to49
            goto 10
          ENDIF
        ENDIF
C
        IF(VShip50to99.ne.999.0) then
          RunVShip = RunVShip + VShip50to99
          IF(CtrVShip.le.RunVShip) then
            Found = 5
            IF(VShip100to249.eq.999.0) then
              MID = VShip50to99/(EST50to99 + EST100to249)
            ELSE
              MID = VShip50to99/EST50to99
            ENDIF
            RunVShip = RunVShip - VShip50to99
            goto 10
          ENDIF
        ENDIF
C
        IF(VShip100to249.ne.999.0) then
          RunVShip = RunVShip + VShip100to249
          IF(CtrVShip.le.RunVShip) then
            Found = 6
            IF(VShip250to499.eq.999.0) then
              MID = VShip100to249/(EST100to249 + EST250to499)
            ELSE
              MID = VShip100to249/EST100to249
            ENDIF
            RunVShip = RunVShip - VShip100to249
            goto 10
          ENDIF
        ENDIF
C
        IF(VShip250to499.ne.999.0) then
```

```
            RunVShip = RunVShip + VShip250to499
            IF(CtrVShip.le.RunVShip) then
              Found = 7
              IF(VShip500to999.eq.999.0) then
                MID = VShip250to499/(EST250to499 + EST500to999)
              ELSE
                MID = VShip250to499/EST250to499
              ENDIF
              RunVShip = RunVShip - VShip250to499
              goto 10
            ENDIF
          ENDIF
C
          IF(VShip500to999.ne.999.0) then
            RunVShip = RunVShip + VShip500to999
            IF(CtrVShip.le.RunVShip) then
              Found = 8
              IF(VShip1000to2499.eq.999.0) then
                MID = VShip500to999/(EST500to999 + EST1000to2499)
              ELSE
                MID = VShip500to999/EST500to999
              ENDIF
              RunVShip = RunVShip - VShip500to999
              goto 10
            ENDIF
          ENDIF
C
          IF(VShip1000to2499.ne.999.0) then
            RunVShip = RunVShip + VShip1000to2499
            IF(CtrVShip.le.RunVShip) then
              Found = 9
              IF(VShip1000to2499.eq.999.0) then
                MID = VShip1000to2499/(EST1000to2499 + EST2500orMore)
              ELSE
                MID = VShip1000to2499/EST1000to2499
              ENDIF
              RunVShip = RunVShip - VShip1000to2499
              goto 10
            ENDIF
          ENDIF
C
          IF(VShip2500orMore.ne.999.0) then
            RunVShip = RunVShip + VShip2500orMore
            IF(CtrVShip.le.RunVShip) then
              Found = 10
              MID = VShip2500orMore/EST2500orMore
```

```
            RunVShip = RunVShip - VShip2500orMore
            goto 10
          ENDIF
        ENDIF
C       ****************************************
 10       IF(Found.eq.1) then
 11         RunVShip = RunVShip + MID
            IncrementEst = IncrementEst + 1
            IF(RunVShip.lt.CtrVShip) goto 11
            MES = ((VShip77 - RunVShip)
     -        /(TtlEstablishments - IncrementEst))/VShip77
C
          ELSEIF(Found.eq.2) then
            IncrementEst = EST1to4
 12         RunVShip = RunVShip + MID
            IncrementEst = IncrementEst + 1
            IF(RunVShip.lt.CtrVShip) goto 12
            MES = ((VShip77 - RunVShip)
     -        /(TtlEstablishments - IncrementEst))/VShip77
C
          ELSEIF(Found.eq.3) then
            IncrementEst = EST1to4 + EST5to9
 13         RunVShip = RunVShip + MID
            IncrementEst = IncrementEst + 1
            IF(RunVShip.lt.CtrVShip) goto 13
            MES = ((VShip77 - RunVShip)
     -        /(TtlEstablishments - IncrementEst))/VShip77
C
          ELSEIF(Found.eq.4) then
            IncrementEst = EST1to4 + EST5to9 + EST10to19
 14         RunVShip = RunVShip + MID
            IncrementEst = IncrementEst + 1
            IF(RunVShip.lt.CtrVShip) goto 14
            MES = ((VShip77 - RunVShip)
     -        /(TtlEstablishments - IncrementEst))/VShip77
C
          ELSEIF(Found.eq.5) then
            IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49
 15         RunVShip = RunVShip + MID
            IncrementEst = IncrementEst + 1
            IF(RunVShip.lt.CtrVShip) goto 15
            MES = ((VShip77 - RunVShip)
     -        /(TtlEstablishments - IncrementEst))/VShip77
C
          ELSEIF(Found.eq.6) then
            IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49 +
```

```
     -        EST50to99
 16           RunVShip = RunVShip + MID
              IncrementEst = IncrementEst + 1
              IF(RunVShip.lt.CtrVShip) goto 16
              MES = ((VShip77 - RunVShip)
     -          /(TtlEstablishments - IncrementEst))/VShip77
C
            ELSEIF(Found.eq.7) then
              IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49 +
     -          EST50to99 + EST100to249
 17           RunVShip = RunVShip + MID
              IncrementEst = IncrementEst + 1
              IF(RunVShip.lt.CtrVShip) goto 17
              MES = ((VShip77 - RunVShip)
     -          /(TtlEstablishments - IncrementEst))/VShip77
C
            ELSEIF(Found.eq.8) then
              IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49 +
     -          EST50to99 + EST100to249 + EST250to499
 18           RunVShip = RunVShip + MID
              IncrementEst = IncrementEst + 1
              IF(RunVShip.lt.CtrVShip) goto 18
              MES = ((VShip77 - RunVShip)
     -          /(TtlEstablishments - IncrementEst))/VShip77
C
            ELSEIF(Found.eq.9) then
              IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49 +
     -          EST50to99 + EST100to249 + EST250to499 + EST500to999
 19           RunVShip = RunVShip + MID
              IncrementEst = IncrementEst + 1
              IF(RunVShip.lt.CtrVShip) goto 19
              MES = ((VShip77 - RunVShip)
     -          /(TtlEstablishments - IncrementEst))/VShip77
C
            ELSEIF(Found.eq.10) then
              IncrementEst = EST1to4 + EST5to9 + EST10to19 + EST20to49 +
     -          EST50to99 + EST100to249 + EST250to499 + EST500to999 +
     -          EST1000to2499
 20           RunVShip = RunVShip + MID
              IncrementEst = IncrementEst + 1
              IF(RunVShip.lt.CtrVShip) goto 20
              MES = ((VShip77 - RunVShip)
     -          /(TtlEstablishments - IncrementEst))/VShip77
            ENDIF
C       *** Calculate MID ***
            MID = MID/VShip77
```

```
C       *** Calculate CDR ***
C
 75        IF((VAdd1to4.eq.999.0).and.(VAdd5to9.eq.999.0)).or.
     -       ((VAdd5to9.eq.999.0).and.(VAdd10to19.eq.999.0)).or.
     -       ((VAdd10to19.eq.999.0).and.(VAdd20to49.eq.999.0)).or.
     -       ((VAdd20to49.eq.999.0).and.(VAdd50to99.eq.999.0)).or.
     -       ((VAdd50to99.eq.999.0).and.(VAdd100to249.eq.999.0)).or.
     -       ((VAdd100to249.eq.999.0).and.(VAdd250to499.eq.999.0)).or.
     -       ((VAdd250to499.eq.999.0).and.(VAdd500to999.eq.999.0)).or.
     -       ((VAdd500to999.eq.999.0).and.(VAdd1000to2499.eq.999.0)).or.
     -       ((VAdd1000to2499.eq.999.0).and.
     -       (VAdd2500orMore.eq.999.0)) then
             CDR = 9999.0
             MCDR = 9999.0
             MESD20 = 9999.0
             goto 80
           ENDIF
           TtlVAdd = 0.0
           IF(VAdd1to4.ne.999.0) TtlVAdd = VAdd1to4
           IF(VAdd5to9.ne.999.0) TtlVAdd = TtlVAdd + VAdd5to9
           IF(VAdd10to19.ne.999.0) TtlVAdd = TtlVAdd + VAdd10to19
           IF(VAdd20to49.ne.999.0) TtlVAdd = TtlVAdd + VAdd20to49
           IF(VAdd50to99.ne.999.0) TtlVAdd = TtlVAdd + VAdd50to99
           IF(VAdd100to249.ne.999.0) TtlVAdd = TtlVAdd + VAdd100to249
           IF(VAdd250to499.ne.999.0) TtlVAdd = TtlVAdd + VAdd250to499
           IF(VAdd500to999.ne.999.0) TtlVAdd = TtlVAdd + VAdd500to999
           IF(VAdd1000to2499.ne.999.0) TtlVAdd = TtlVAdd +
     -       VAdd1000to2499
           IF(VAdd2500orMore.ne.999.0) TtlVAdd = TtlVAdd +
     -       VAdd2500orMore
           CtrVAdd = TtlVAdd/2
           IF((NEmp1to4.eq.999.0).and.(NEmp5to9.eq.999.0)).or.
     -       ((NEmp5to9.eq.999.0).and.(NEmp10to19.eq.999.0)).or.
     -       ((NEmp10to19.eq.999.0).and.(NEmp20to49.eq.999.0)).or.
     -       ((NEmp20to49.eq.999.0).and.(NEmp50to99.eq.999.0)).or.
     -       ((NEmp50to99.eq.999.0).and.(NEmp100to249.eq.999.0)).or.
     -       ((NEmp100to249.eq.999.0).and.(NEmp250to499.eq.999.0)).or.
     -       ((NEmp250to499.eq.999.0).and.(NEmp500to999.eq.999.0)).or.
     -       ((NEmp500to999.eq.999.0).and.(NEmp1000to2499.eq.999.0)).or.
     -       ((NEmp1000to2499.eq.999.0).and.
     -       (NEmp2500orMore.eq.999.0)) then
             CDR = 9999.0
             goto 80
           ENDIF
           TtlNEmp = 0.0
           IF(NEmp1to4.ne.999.0) TtlNEmp = NEmp1to4
```

```
      IF(NEmp5to9.ne.999.0) TtlNEmp = TtlNEmp + NEmp5to9
      IF(NEmp10to19.ne.999.0) TtlNEmp = TtlNEmp + NEmp10to19
      IF(NEmp20to49.ne.999.0) TtlNEmp = TtlNEmp + NEmp20to49
      IF(NEmp50to99.ne.999.0) TtlNEmp = TtlNEmp + NEmp50to99
      IF(NEmp100to249.ne.999.0) TtlNEmp = TtlNEmp + NEmp100to249
      IF(NEmp250to499.ne.999.0) TtlNEmp = TtlNEmp + NEmp250to499
      IF(NEmp500to999.ne.999.0) TtlNEmp = TtlNEmp + NEmp500to999
      IF(NEmp1000to2499.ne.999.0) TtlNEmp = TtlNEmp +
     -  NEmp1000to2499
      IF(NEmp2500orMore.ne.999.0) TtlNEmp = TtlNEmp +
     -  NEmp2500orMore
      IF(VAdd1to4.ne.999.0) then
        RunVAdd = VAdd1to4
        IF(CtrVAdd.le.RunVAdd) then
          RunVAdd = 0.0
          IF(VAdd5to9.ge.999.0) then
            Increment = VAdd5to9/(EST1to4 + EST5to9)
          ELSE
            Increment = VAdd1to4/EST1to4
          ENDIF
   30     RunVAdd = RunVAdd + Increment
          IF(RunVAdd.lt.CtrVAdd) goto 30
          Fraction = RunVAdd/VAdd1to4
          UpperVAdd = TtlVAdd - RunVAdd
          LowerVAdd = RunVAdd
          LowerEmp = Fraction * NEmp1to4
          UpperEmp = TtlNEmp - LowerEmp
          goto 45
        ENDIF
      ENDIF
C
      IF(VAdd5to9.ne.999.0) then
        RunVAdd = RunVAdd + VAdd5to9
        IF(CtrVAdd.le.RunVAdd) then
          RunVAdd = RunVAdd - VAdd5to9
          IF(VAdd50to99.ge.999.0) then
            Increment = VAdd5to9/(EST5to9 + EST10to19)
          ELSE
            Increment = VAdd5to9/EST5to9
          ENDIF
   31     RunVAdd = RunVAdd + Increment
          IF(RunVAdd.lt.CtrVAdd) goto 31
          Fraction = (RunVAdd-VAdd1to4)/(VAdd5to9)
          UpperVAdd = TtlVAdd - RunVAdd
          LowerVAdd = RunVAdd
          LowerEmp = (Fraction * NEmp5to9) + NEmp1to4
```

```
            UpperEmp = TtlNEmp - LowerEmp
            goto 45
          ENDIF
        ENDIF
C
        IF(VAdd10to19.ne.999.0) then
          RunVAdd = RunVAdd + VAdd10to19
          IF(CtrVAdd.le.RunVAdd) then
            RunVAdd = RunVAdd - VAdd10to19
            IF(VAdd50to99.ge.999.0) then
              Increment = VAdd10to19/(EST10to19 + EST20to49)
            ELSE
              Increment = VAdd10to19/EST10to19
            ENDIF
 32         RunVAdd = RunVAdd + Increment
            IF(RunVAdd.lt.CtrVAdd) goto 32
            Fraction = (RunVAdd-VAdd1to4-VAdd5to9)/(VAdd10to19)
            UpperVAdd = TtlVAdd - RunVAdd
            LowerVAdd = RunVAdd
            LowerEmp = (Fraction * NEmp10to19) + NEmp5to9 + NEmp1to4
            UpperEmp = TtlNEmp - LowerEmp
            goto 45
          ENDIF
        ENDIF
C
        IF(VAdd20to49.ne.999.0) then
          RunVAdd = RunVAdd + VAdd20to49
          IF(CtrVAdd.le.RunVAdd) then
            RunVAdd = RunVAdd - VAdd20to49
            IF(VAdd50to99.ge.999.0) then
              Increment = VAdd20to49/(EST20to49 + EST50to99)
            ELSE
              Increment = VAdd20to49/EST20to49
            ENDIF
 33         RunVAdd = RunVAdd + Increment
            Accum1 = Accum1 + Increment
            IF(RunVAdd.lt.CtrVAdd) goto 33
            Fraction = (Accum1)/(VAdd20to49)
            UpperVAdd = TtlVAdd - RunVAdd
            LowerVAdd = RunVAdd
            LowerEmp = (Fraction * NEmp20to49) +  NEmp10to19 +
     -        NEmp5to9 + NEmp1to4
            UpperEmp = TtlNEmp - LowerEmp
            goto 45
          ENDIF
        ENDIF
```

```
C
      IF(VAdd50to99.ne.999.0) then
        RunVAdd = RunVAdd + VAdd50to99
        IF(CtrVAdd.le.RunVAdd) then
          RunVAdd = RunVAdd - VAdd50to99
          IF(VAdd100to249.ge.999.0) then
            Increment = VAdd50to99/(EST50to99 + EST100to249)
          ELSE
            Increment = VAdd50to99/EST50to99
          ENDIF
 34       RunVAdd = RunVAdd + Increment
          Accuml = Accuml + Increment
          IF(RunVAdd.lt.CtrVAdd) goto 34
          Fraction = (Accuml)/(VAdd50to99)
          UpperVAdd = TtlVAdd - RunVAdd
          LowerVAdd = RunVAdd
          LowerEmp = (Fraction * NEmp50to99) + NEmp20to49 +
     -      NEmp10to19 + NEmp5to9 + NEmp1to4
          UpperEmp = TtlNEmp - LowerEmp
          goto 45
        ENDIF
      ENDIF
C
      IF(VAdd100to249.ne.999.0) then
        RunVAdd = RunVAdd + VAdd100to249
        IF(CtrVAdd.le.RunVAdd) then
          RunVAdd = RunVAdd - VAdd100to249
          IF(VAdd250to499.ge.999.0) then
            Increment = VAdd100to249/(EST100to249 + EST250to499)
          ELSE
            Increment = VAdd50to99/EST50to99
          ENDIF
 35       RunVAdd = RunVAdd + Increment
          Accuml = Accuml + Increment
          IF(RunVAdd.lt.CtrVAdd) goto 35
          Fraction = (Accuml)/(VAdd100to249)
          UpperVAdd = TtlVAdd - RunVAdd
          LowerVAdd = RunVAdd
          LowerEmp = (Fraction * NEmp100to249) + NEmp50to99 +
     -      NEmp20to49 + NEmp10to19 + NEmp5to9 + NEmp1to4
          UpperEmp = TtlNEmp - LowerEmp
          goto 45
        ENDIF
      ENDIF
C
      IF(VAdd250to499.ne.999.0) then
```

```
            RunVAdd = RunVAdd + VAdd250to499
            IF(CtrVAdd.le.RunVAdd) then
              RunVAdd = RunVAdd - VAdd250to499
              IF(VAdd500to999.ge.999.0) then
                Increment = VAdd250to499/(EST250to499 + EST500to999)
              ELSE
                Increment = VAdd250to499/EST250to499
              ENDIF
   36         RunVAdd = RunVAdd + Increment
              Accuml = Accuml + Increment
              IF(RunVAdd.lt.CtrVAdd) goto 36
              Fraction = (Accuml)/(VAdd250to499)
              UpperVAdd = TtlVAdd - RunVAdd
              LowerVAdd = RunVAdd
              LowerEmp = (Fraction * NEmp250to499) + NEmp100to249 +
     -          NEmp50to99 + NEmp20to49 + NEmp 10to19 + NEmp 5to9 +
     -          NEmp1to4
              UpperEmp = TtlNEmp - LowerEmp
              goto 45
            ENDIF
          ENDIF
C
          IF(VAdd500to999.ne.999.0) then
            RunVAdd = RunVAdd + VAdd500to999
            IF(CtrVAdd.le.RunVAdd) then
              RunVAdd = RunVAdd - VAdd500to999
              IF(VAdd1000to2499.ge.999.0) then
                Increment = VAdd500to999/(EST500to999 + EST1000to2499)
              ELSE
                Increment = VAdd500to999/EST500to999
              ENDIF
   37         RunVAdd = RunVAdd + Increment
              Accuml = Accuml + Increment
              IF(RunVAdd.lt.CtrVAdd) goto 37
              Fraction = (Accuml)/(VAdd500to999)
              UpperVAdd = TtlVAdd - RunVAdd
              LowerVAdd = RunVAdd
              LowerEmp = (Fraction * NEmp500to999) + NEmp250to499
     -          + NEmp100to249 +NEmp50to99 + NEmp20to49 +
     -          NEmp 10to19 + NEmp 5to9 + NEmp1to4
              UpperEmp = TtlNEmp - LowerEmp
              goto 45
            ENDIF
          ENDIF
C
          IF(VAdd1000to2499.ne.999.0) then
```

```
            RunVAdd = RunVAdd + VAdd1000to2499
            IF(CtrVAdd.le.RunVAdd) then
              RunVAdd = RunVAdd - VAdd1000to2499
              IF(VAdd2500orMore.ge.999.0) then
                Increment = VAdd1000to2499/(EST1000to2499
     -            + EST2500orMore)
              ELSE
                Increment = VAdd1000to2499/EST1000to2499
              ENDIF
   38         RunVAdd = RunVAdd + Increment
              Accuml = Accuml + Increment
              IF(RunVAdd.lt.CtrVAdd) goto 38
              Fraction = (Accuml)/(VAdd1000to2499)
              UpperVAdd = TtlVAdd - RunVAdd
              LowerVAdd = RunVAdd
              LowerEmp = (Fraction * NEmp1000to2499) + NEmp500to999 +
     -          NEmp250to499 + NEmp100to249 +NEmp50to99 +
     -          NEmp20to49 +NEmp 10to19 + NEmp 5to9 + NEmp1to4
              UpperEmp = TtlNEmp - LowerEmp
              goto 45
            ENDIF
          ENDIF
C
          RunVAdd = RunVAdd + VAdd2500orMore
          IF(CtrVAdd.le.RunVAdd) then
            RunVAdd = RunVAdd - VAdd2500orMore
            Increment = VAdd2500orMore/EST2500orMore
   39       RunVAdd = RunVAdd + Increment
            Accuml = Accuml + Increment
            IF(RunVAdd.lt.CtrVAdd) goto 39
            Fraction = (Accuml)/(VAdd2500orMore)
            UpperVAdd = TtlVAdd - RunVAdd
            LowerVAdd = RunVAdd
            LowerEmp = (Fraction * NEmp2500orMore) +  NEmp1000to2499 +
     -        NEmp500to999 + NEmp250to499 + NEmp100to249 + NEmp50to99 +
     -        NEmp20to49 +NEmp 10to19 + NEmp 5to9 + NEmp1to4
            UpperEmp = TtlNEmp - LowerEmp
            goto 45
          ENDIF
C       ****************************************
   45     CDR = (LowerVAdd/LowerEmp)/(UpperVAdd/UpperEmp)
          IF(MID.ne.9999) then
            IF(CDR.lt.0.75) then
              MCDR = MID
            ELSE
              MCDR = 0.0
```

```
        ENDIF
      ELSE
        MCDR = 9999.0
      ENDIF
      IF(MES.ne.9999.0) then
        IF(CDR.lt.0.80) then
          MESD20 = MES
        ELSE
          MESD20 = 0.0
        ENDIF
      ELSE
        MESD20 = 9999.0
      ENDIF
 80   write(2,101) SIC,Disp,CPCM7576,CPCM75,CPCM76,
     -  C4,MID,MES,CDR,CAR,I,KO75,KO76,
     -  KO7576,AdvrToSales,GROW,NCO,VShip75,VShip76,
     -  Payroll75,Payroll76,VAdd75,VAdd76,
     -  ImportsToSales,ExportsToSales,MCDR,MESD20
101   format(I4,5F10.4,/,4F10.4,/,6F10.4,I5,/,6F10.2,/,4F10.4)
      write(*,*) SIC
      goto 1
 55   STOP
      end
```

APPENDIX D: FTC Build

```
program FTCbuild
IMPLICIT NONE
double precision FTCCode75,FTCCode76,PartRat75,PartRat76
double precision CoverRat75,CoverRat76
double precision SpecizRat75,SpecizRat76
double precision PPE75Acqd5,PPE75Acqd5To10
double precision PPE75Acqd10To20,PPE75Acqd20Plus
double precision PPE76Acqd5,PPE76Acqd5To10
double precision PPE76Acqd10To20,PPE76Acqd20Plus
double precision LBADV76,LBADV75,LBADV7576
double precision KOftc75,KOftc76,KOftc7576
double precision LBRD75,LBRD76,LBRD7576
double precision DeprToSales75,DeprToSales76,DeprToSales7576
double precision LBOPI75,LBOPI76,LBOPI7576
double precision LBCU75,LBCU76,LBCU7576
double precision PCM75,PCM76,PCM7576
double precision AdjPCM75,AdjPCM76,AdjPCM7576
double precision DerPCM75,DerPCM76,DerPCM7576
double precision LBASS75,LBASS76,LBASS7576
double precision GenAdminToSales75,GenAdminToSales76
double precision GenAdminToSales7576
integer SIC
integer CensusCode1,CensusCode2,CensusCode3,CensusCode4
integer CensusCode5,NumberCompanies75,NumberCompanies76
integer MedAdvExpTrac75,MedAdvExpTrac76
integer MedAdvExp75,MedAdvExp76
integer MedAdvExpNonTrac75,MedAdvExpNonTrac76
integer OthrSellExpNonTrac75,OthrSellExpNonTrac76
integer OthrSellExpTrac75,OthrSellExpTrac76
integer OthrSellExp75,OthrSellExp76
integer Sales74,Sales75,Sales76
integer GeneralAndAdminTrac75
integer GeneralAndAdminTrac76
integer GeneralAndAdminNonTrac75
integer GeneralAndAdminNonTrac76
integer GeneralAndAdmin75
integer GeneralAndAdmin76
integer GrossPlantPropEquipTrac75,GrossPlantPropEquipTrac76
integer GrossPlantPropEquipNonTrac75
integer GrossPlantPropEquipNonTrac76
integer GrossPlantPropEquip75
integer GrossPlantPropEquip76
integer InvenLastYearTrac75,InvenLastYearTrac76
integer InvenLastYear75,InvenLastYear76
integer InvenLastYearNonTrac75,InvenLastYearNonTrac76
```

```
      integer InvenLastYearNonTrac75,InvenLastYearNonTrac76
      integer InvenThisYearTrac75,InvenThisYearTrac76
      integer InvenThisYear75,InvenThisYear76
      integer InvenThisYearNonTrac75,InvenThisYearNonTrac76
      integer Payroll75,Payroll76
      integer MaterialsUsed75,MaterialsUsed76
      integer RandD75,RandD76
      integer Depr75,Depr76
      integer OperatingIncome75,OperatingIncome76
      integer AllOtherAssetsTrac75,AllOtherAssetsTrac76
      integer AllOtherAssets75,AllOtherAssets76
      integer AllOtherAssetsNonTrac75,AllOtherAssetsNonTrac76
      integer DeltaInventory75,DeltaInventory76
      OPEN(1,FILE='FTC75',STATUS='OLD',ACCESS='SEQUENTIAL',
     -  FORM='FORMATTED',POSITION='APPEND',
     -  ACTION='READ')
      OPEN(2,FILE='FTC76',STATUS='OLD',ACCESS='SEQUENTIAL',
     -  FORM='FORMATTED',POSITION='APPEND',
     -  ACTION='READ')
      OPEN(3,FILE='FTCDataBase',STATUS='NEW',ACCESS='SEQUENTIAL',
     -  FORM='FORMATTED',
     -  ACTION='WRITE')
      REWIND (1)
      REWIND (2)
      REWIND (3)
1     SIC = 0
      CensusCode1 = 0
      CensusCode2 = 0
      CensusCode3 = 0
      CensusCode4 = 0
      CensusCode5 = 0
      NumberCompanies75 = 0
      NumberCompanies76 = 0
      MedAdvExpTrac75 = 0
      MedAdvExpNonTrac75 = 0
      MedAdvExp75 = 0
      MedAdvExpTrac76 = 0
      MedAdvExpNonTrac76 = 0
      MedAdvExp76 = 0
      OthrSellExpTrac75 = 0
      OthrSellExpNonTrac75 = 0
      OthrSellExpNonTrac76 = 0
      OthrSellExpTrac76 = 0
      OthrSellExp75 = 0
      OthrSellExp76 = 0
      Sales75 = 0
```

Sales74 = 0
Sales76 = 0
GeneralAndAdminNonTrac75 = 0
GeneralAndAdminTrac75 = 0
GeneralAndAdminTrac76 = 0
GeneralAndAdmin75 = 0
GeneralAndAdmin76 = 0
GeneralAndAdminNonTrac76 = 0
GenAdminToSales75 = 0.0
GenAdminToSales76 = 0.0
GenAdminToSales7576 = 0.0
GrossPlantPropEquipTrac75 = 0
GrossPlantPropEquipNonTrac75 = 0
GrossPlantPropEquipTrac76 = 0
GrossPlantPropEquipNonTrac76 = 0
GrossPlantPropEquip75 = 0
GrossPlantPropEquip76 = 0
InvenLastYearTrac75 = 0
InvenLastYearNonTrac75 = 0
InvenLastYearTrac76 = 0
InvenLastYearNonTrac76 = 0
InvenThisYearNonTrac75 = 0
InvenThisYearTrac75 = 0
InvenThisYearTrac76 = 0
InvenThisYearNonTrac76 = 0
InvenLastYear75 = 0
InvenLastYear76 = 0
InvenThisYear76 = 0
InvenThisYear75 = 0
Payroll75 = 0
Payroll76 = 0
MaterialsUsed76 = 0
MaterialsUsed75 = 0
RandD75 = 0
RandD76 = 0
Depr75 = 0
Depr 76 = 0
OperatingIncome75 = 0
OperatingIncome76 = 0
AllOtherAssetsTrac75 = 0
AllOtherAssetsNonTrac75 = 0
AllOtherAssetsTrac76 = 0
AllOtherAssetsNonTrac76 = 0
AllOtherAssets76 = 0
AllOtherAssets75 = 0
DeltaInventory75 = 0

DeltaInventory76 = 0
FTCCode75 = 00.00
PartRat75 = 0.0
CoverRat75 = 0.0
SpeclzRat75 = 0.0
FTCCode76 = 0.0
PartRat76 = 0.0
CoverRat76 = 0.0
SpeclzRat76 = 0.0
PPE75Acqd5 = 0.0
PPE75Acqd5To10 = 0.0
PPE75Acqd10To20 = 0.0
PPE75Acqd20Plus = 0.0
PPE76Acqd5 = 0.0
PPE76Acqd5To10 = 0.0
PPE76Acqd10To20 = 0.0
PPE76Acqd20Plus = 0.0
LBADV75 = 0.0
LBADV76 = 0.0
LBADV7576 = 0.0
KOftc75 = 0.0
KOftc76 = 0.0
KOftc7576 = 0.0
LBRD75 = 0.0
LBRD76 = 0.0
LBRD7576 = 0.0
DeprToSales75 = 0.0
DeprToSales76 = 0.0
DeprToSales7576 = 0.0
LBOPI75 = 0.0
LBOPI76 = 0.0
LBOPI7576 = 0.0
LBCU75 = 0.0
LBCU76 = 0.0
LBCU7576 = 0.0
LBCU75 = 0.0
LBCU76 = 0.0
LBCU7576 = 0.0
PCM75 = 0.0
PCM76 = 0.0
PCM7576 = 0.0
AdjPCM75 = 0.0
AdjPCM76 = 0.0
AdjPCM7576 = 0.0
DerPCM75 = 0.0
DerPCM76 = 0.0

```
      DerPCM7576 = 0.0
      LBASS75 = 0.0
      LBASS76 = 0.0
      LBASS7576 = 0.0
      read(1,101) FTCCode75,CensusCode1,CensusCode2,CensusCode3,
     -  CensusCode4,CensusCode5,NumberCompanies75,PartRat75,
     -  SpeclzRat75,CoverRat75,Sales75,
     -  Sales74,
     -  MedAdvExpTrac75,MedAdvExpNonTrac75,
     -  OthrSellExpTrac75,OthrSellExpNonTrac75,
     -  GeneralAndAdminTrac75,
     -  GeneralAndAdminNonTrac75,
     -  OperatingIncome75,
     -  GrossPlantPropEquipTrac75,
     -  GrossPlantPropEquipNonTrac75,
     -  InvenThisYearTrac75,InvenThisYearNonTrac75,
     -  InvenLastYearTrac75,InvenLastYearNonTrac75,
     -  AllOtherAssetsTrac75,AllOtherAssetsNonTrac75,
     -  Payroll75,MaterialsUsed75,Depr75,
     -  RandD75,PPE75Acqd5,PPE75Acqd5To10,
     -  PPE75Acqd10To20,PPE75Acqd20Plus
101   FORMAT(F5.2,5I5,I3,3F6.1,2I9,/,7I8,/,9I8,/,I9,2I8,4F5.1)
      IF(FTCCode75.eq.0.0) goto 150
      read(2,102) FTCCode76,CensusCode1,CensusCode2,CensusCode3,
     -  CensusCode4,CensusCode5,NumberCompanies76,PartRat76,
     -  SpeclzRat76,CoverRat76,Sales76,
     -  MedAdvExpTrac76,MedAdvExpNonTrac76,
     -  OthrSellExpTrac76,OthrSellExpNonTrac76,
     -  GeneralAndAdminTrac76,
     -  GeneralAndAdminNonTrac76,
     -  OperatingIncome76,
     -  GrossPlantPropEquipTrac76,
     -  GrossPlantPropEquipNonTrac76,
     -  InvenThisYearTrac76,InvenThisYearNonTrac76,
     -  InvenLastYearTrac76,InvenLastYearNonTrac76,
     -  AllOtherAssetsTrac76,AllOtherAssetsNonTrac76,
     -  Payroll76,MaterialsUsed76,Depr76,
     -  RandD76,PPE76Acqd5,PPE76Acqd5To10,
     -  PPE76Acqd10To20,PPE76Acqd20Plus
102   FORMAT(F5.2,5I5,I3,3F6.1,I9,/,7I8,/,9I8,/,I9,2I8,4F5.1)
      IF(FTCCode75.eq.FTCCode76).and.(CensusCode2.eq.0) then
        SIC = CensusCode1
C
C       *** Media Advertising Expense ***
        IF((MedAdvExpTrac76.eq.999999).and.
     -    (MedAdvExpNonTrac76.eq.999999)) then
```

```
            MedAdvExp76 = 999999
          ELSE
            IF(MedAdvExpTrac76.eq.999999) MedAdvExpTrac76 = 0
            IF(MedAdvExpNonTrac76.eq.999999) MedAdvExpNonTrac76 = 0
            MedAdvExp76 = MedAdvExpTrac76 + MedAdvExpNonTrac76
          ENDIF
          IF((MedAdvExpTrac75.eq.999999).and.
     -      (MedAdvExpNonTrac75.eq.999999)) then
            MedAdvExp75 = 999999
          ELSE
            IF(MedAdvExpTrac75.eq.999999) MedAdvExpTrac75 = 0
            IF(MedAdvExpNonTrac75.eq.999999) MedAdvExpNonTrac75 = 0
            MedAdvExp75 = MedAdvExpTrac75 + MedAdvExpNonTrac75
          ENDIF
C
C         *** General and Administrative Expenses ***
          IF((GeneralAndAdminTrac76.eq.999999).and.
     -      (GeneralAndAdminNonTrac76.eq.999999)) then
            GeneralAndAdmin76 = 999999
          ELSE
            IF(GeneralAndAdminTrac76.eq.999999) then
              GeneralAndAdminTrac76 = 0
            ENDIF
            IF(GeneralAndAdminNonTrac76.eq.999999) then
              GeneralAndAdminNonTrac76 = 0
            ENDIF
            GeneralAndAdmin76 = GeneralAndAdminTrac76 +
     -        GeneralAndAdminNonTrac76
          ENDIF
          IF((GeneralAndAdminTrac75.eq.999999).and.
     -      (GeneralAndAdminNonTrac75.eq.999999)) then
            GeneralAndAdmin75 = 999999
          ELSE
            IF(GeneralAndAdminTrac75.eq.999999) then
              GeneralAndAdminTrac75 = 0
            ENDIF
            IF(GeneralAndAdminNonTrac75.eq.999999) then
              GeneralAndAdminNonTrac75 = 0
            ENDIF
            GeneralAndAdmin75 = GeneralAndAdminTrac75 +
     -        GeneralAndAdminNonTrac75
          ENDIF
C
C           *** General Administrative To Sales Ratio ***
          IF(Sales75.ne.99999999) then
            GenAdminToSales75 = DBLE(GeneralAndAdmin75)/Sales75
```

```
            ELSE
              GenAdminToSales75 = 9999.0
            ENDIF
            IF(Sales76.ne.99999999) then
              GenAdminToSales76 = DBLE(GeneralAndAdmin76)/Sales76
            ELSE
              GenAdminToSales76 = 9999.0
            ENDIF
            IF(GenAdminToSales75.ne.9999.0).and.
     -        (GenAdminToSales76.ne.9999.0) then
              GenAdminToSales7576 = (GenAdminToSales75 +
     -         GenAdminToSales76)/2
            ELSE
              GenAdminToSales7576 = 9999.0
            ENDIF
C
C           *** Gross Plant, Property, and Equipment ***
            IF((GrossPlantPropEquipTrac75.eq.9999999).and.
     -        (GrossPlantPropEquipNonTrac75.eq.9999999)) then
              GrossPlantPropEquip75 = 9999999
            ELSE
              IF(GrossPlantPropEquipTrac75.eq.9999999) then
                GrossPlantPropEquipTrac75 = 0
            ENDIF
              IF(GrossPlantPropEquipNonTrac75.eq.9999999) then
                GrossPlantPropEquipNonTrac75 = 0
            ENDIF
            GrossPlantPropEquip75 = GrossPlantPropEquipTrac75 +
     -        GrossPlantPropEquipNonTrac75
            ENDIF
            IF((GrossPlantPropEquipTrac76.eq.9999999).and.
     -        (GrossPlantPropEquipNonTrac76.eq.9999999)) then
              GrossPlantPropEquip76 = 9999999
            ELSE
              IF(GrossPlantPropEquipTrac76.eq.9999999) then
              GrossPlantPropEquipTrac76 = 0
            ENDIF
            IF(GrossPlantPropEquipNonTrac76.eq.9999999) then
              GrossPlantPropEquipNonTrac76 = 0
            ENDIF
            GrossPlantPropEquip76 = GrossPlantPropEquipTrac76 +
     -         GrossPlantPropEquipNonTrac76
            ENDIF
C
C           *** Inventories ***
            IF((InvenThisYearTrac75.eq.9999999).and.
```

```
     -          (InvenThisYearNonTrac75.eq.9999999)) then
                InvenThisYear75 = 9999999
              ELSE
                IF(InvenThisYearTrac75.eq.9999999) InvenThisYearTrac75 = 0
                IF(InvenThisYearNonTrac75.eq.9999999) then
                  InvenThisYearNonTrac75 = 0
                ENDIF
                InvenThisYear75 = InvenThisYearTrac75 +
     -            InvenThisYearNonTrac75
              ENDIF
              IF((InvenThisYearTrac76.eq.9999999).and.
     -          (InvenThisYearNonTrac76.eq.9999999)) then
                InvenThisYear76 = 9999999
              ELSE
                IF(InvenThisYearTrac76.eq.9999999) InvenThisYearTrac76 = 0
                IF(InvenThisYearNonTrac76.eq.9999999) then
                  InvenThisYearNonTrac76 = 0
                ENDIF
                InvenThisYear76 = InvenThisYearTrac76 +
     -            InvenThisYearNonTrac76
              ENDIF
              IF((InvenLastYearTrac75.eq.9999999).and.
     -          (InvenLastYearNonTrac75.eq.9999999)) then
                InvenLastYear75 = 9999999
              ELSE
                IF(InvenLastYearTrac75.eq.9999999) InvenLastYearTrac75 = 0
                IF(InvenLastYearNonTrac75.eq.9999999) then
                  InvenLastYearNonTrac75 = 0
                ENDIF
                InvenLastYear75 = InvenLastYearTrac75 +
     -            InvenLastYearNonTrac75
              ENDIF
              IF((InvenLastYearTrac76.eq.9999999).and.
     -          (InvenLastYearNonTrac76.eq.9999999)) then
                InvenLastYear76 = 9999999
              ELSE
                IF(InvenLastYearTrac76.eq.9999999) InvenLastYearTrac76 = 0
                IF(InvenLastYearNonTrac76.eq.9999999) then
                  InvenLastYearNonTrac76 = 0
                ENDIF
                InvenLastYear76 = InvenLastYearTrac76 +
     -            InvenLastYearNonTrac76
              ENDIF
C
C             *** Other Assets ***
              IF((AllOtherAssetsTrac75.eq.9999999).and.
```

```
     -          (AllOtherAssetsNonTrac75.eq.9999999)) then
                AllOtherAssets75 = 9999999
               ELSE
                IF(AllOtherAssetsTrac75.eq.9999999) then
                  AllOtherAssetsTrac75 = 0
                ENDIF
                IF(AllOtherAssetsNonTrac75.eq.9999999) then
                  AllOtherAssetsNonTrac75 = 0
                ENDIF
                AllOtherAssets75 = AllOtherAssetsTrac75 +
     -            AllOtherAssetsNonTrac75
               ENDIF
               IF(AllOtherAssetsTrac76.eq.9999999).and.
     -          (AllOtherAssetsNonTrac76.eq.9999999) then
                AllOtherAssets76 = 9999999
               ELSE
                IF(AllOtherAssetsTrac76.eq.9999999)
     -            AllOtherAssetsTrac76 = 0
                IF(AllOtherAssetsNonTrac76.eq.9999999)
     -            AllOtherAssetsNonTrac76 = 0
                  AllOtherAssets76 = AllOtherAssetsTrac76 +
     -              AllOtherAssetsNonTrac76
               ENDIF
C
C              *** Advertising/Sales Ratio ***
               IF((MedAdvExp76.ne.999999).and.
     -          (Sales76.ne.99999999)) then
                LBADV76 =  DBLE(MedAdvExp76)/DBLE(Sales76)
               ELSE
                LBADV76 = 9999.0
               ENDIF
               IF((MedAdvExp75.ne.999999).and.
     -          (Sales75.ne.99999999)) then
                LBADV75 =  DBLE(MedAdvExp75)/DBLE(Sales75)
               ELSE
                LBADV75 = 9999.0
               ENDIF
               IF(LBADV75.ne.9999.0).and.(LBADV76.ne.9999.0) then
               LBADV7576 = (LBADV75 + LBADV76)/2
               ELSE
                LBADV7576 = 9999.0
               ENDIF
C
C              *** Capital Output Ratio ***
               IF((GrossPlantPropEquip75.ne.9999999).and.
     -          (Sales75.ne.99999999)) then
```

```
            KOftc75 = DBLE(GrossPlantPropEquip75)/DBLE(Sales75)
          ELSE
            KOftc75 = 9999.0
          ENDIF
          IF((GrossPlantPropEquip76.ne.9999999).and.
     -      (Sales76.ne.99999999)) then
            KOftc76 = DBLE(GrossPlantPropEquip76)/DBLE(Sales76)
          ELSE
            KOftc76 = 9999.0
          ENDIF
          IF(KOftc76.ne.9999.0).and.(KOftc75.ne.9999.0) then
            KOftc7576 = (KOftc75 + KOftc76)/2
          ELSE
            KOftc7576 = 9999.0
          ENDIF
C
C         *** R & D/Sales Ratio ***
          IF(RandD75.ne.9999999).and.(Sales75.ne.99999999) then
            LBRD75 = DBLE(RandD75)/DBLE(Sales75)
          ELSE
            LBRD75 = 9999.0
          ENDIF
          IF(RandD76.ne.9999999).and.(Sales76.ne.99999999) then
            LBRD76 = DBLE(RandD76)/DBLE(Sales76)
          ELSE
            LBRD76 = 9999.0
          ENDIF
          IF(LBRD75.ne.9999.0).and.(LBRD76.ne.9999.0) then
            LBRD7576 = (LBRD75 + LBRD76)/2
          ELSE
            LBRD7576 = 9999.0
          ENDIF
C
C         *** DeprToSales ***
          IF(DeprToSales75.ne.9999999).and.(Sales75.ne.99999999) then
            DeprToSales75 = DBLE(Depr75)/DBLE(Sales75)
          ELSE
            DeprToSales75 = 9999.0
          ENDIF
          IF(DeprToSales76.ne.9999999).and.(Sales76.ne.99999999) then
            DeprToSales76 = DBLE(Depr76)/DBLE(Sales76)
          ELSE
            DeprToSales76 = 9999.0
          ENDIF
          IF((DeprToSales75.ne.9999.0).and.
     -      (DeprToSales76.ne.9999.0)) then
```

```
            DeprToSales7576 = (DeprToSales75 + DeprToSales76)/2
          ELSE
            DeprToSales7576 = 9999.0
          ENDIF
C
C         *** Operating Income/Sales ***
          IF((OperatingIncome75.ne.999999).and.
     -      (Sales75.ne.99999999)) then
            LBOPI75 = DBLE(OperatingIncome75)/DBLE(Sales75)
          ELSE
            LBOPI75 = 9999.0
          ENDIF
          IF((OperatingIncome76.ne.999999).and.
     -      (Sales76.ne.99999999)) then
            LBOPI76 = DBLE(OperatingIncome76)/DBLE(Sales76)
          ELSE
            LBOPI76 = 9999.0
          ENDIF
          IF(LBOPI75.ne.9999.0).and.(LBOPI76.ne.9999.0) then
            LBOPI7576 = (LBOPI75 + LBOPI76)/2
          ELSE
            LBOPI7576 = 9999.0
          ENDIF
C
C         *** Capacity Utilization ***
          IF(Sales75.ne.99999999).and.(Sales74.ne.99999999) then
            LBCU75 = DBLE(Sales75)/DBLE(Sales74)
          ELSE
            LBCU75 = 9999.0
          ENDIF
          IF(Sales76.ne.99999999).and.(Sales75.ne.99999999) then
            LBCU76 = DBLE(Sales76)/DBLE(Sales75)
          ELSE
            LBCU76 = 9999.0
          ENDIF
          IF(LBCU75.ne.9999.0).and.(LBCU76.ne.9999.0) then
            LBCU7576 = (LBCU75 + LBCU76)/2
          ELSE
            LBCU7576 = 9999.0
          ENDIF
          IF(LBCU75.gt.1) LBCU75 = 1
          IF(LBCU76.gt.1) LBCU76 = 1
          IF(LBCU7576.gt.1) LBCU7576 = 1
C
C       *** Change In Inventories ***
          IF((InvenThisYear75.ne.9999999).and.
```

```
     -          (InvenLastYear75.ne.9999999)) then
                DeltaInventory75 = InvenThisYear75 - InvenLastYear75
              ELSE
                DeltaInventory75 = 999
              ENDIF
              IF((InvenThisYear76.ne.9999999).and.
     -          (InvenLastYearTrac76.ne.9999999)) then
                DeltaInventory76 = InvenThisYear76 - InvenLastYear76
              ELSE
                DeltaInventory76 = 999
              ENDIF
C
C             *** Assets/Sales ***
              IF((GrossPlantPropEquip75.ne.9999999).and.
     -          (DeltaInventory75.ne.999).and.
     -          (AllOtherAssets75.ne.9999999).and.
     -          (LBCU75.ne.999).and.(Sales75.ne.99999999)) then
                LBASS75 = DBLE(GrossPlantPropEquip75 +
     -           DeltaInventory75 + AllOtherAssets75) *
     -           (DBLE(LBCU75)/DBLE(Sales75))
              ELSE
                LBASS75 = 9999.0
              ENDIF
              IF((GrossPlantPropEquip76.ne.9999999).and.
     -          (DeltaInventory76.ne.999).and.
     -          (AllOtherAssets76.ne.9999999).and.
     -          (LBCU76.ne.999).and.(Sales76.ne.99999999)) then
                LBASS76 = DBLE(GrossPlantPropEquip76 +
     -           DeltaInventory76 + AllOtherAssets76) *
     -           (DBLE(LBCU76)/DBLE(Sales76))
              ELSE
                LBASS76 = 9999.0
              ENDIF
              IF(LBASS75.ne.9999.0).and.(LBASS76.ne.9999.0) then
                LBASS7576 = (LBASS75 + LBASS76)/2
              ELSE
                LBASS7576 = 9999.0
              ENDIF
C
C             *** Price-Cost Margin ***
              IF((Sales76.ne.99999999).and.
     -          (MaterialsUsed76.ne.99999999).and.
     -          (Payroll76.ne.9999999).and.(DeltaInventory76.ne.999)
     -           .and.(Sales76.ne.99999999)) then
                PCM76 = DBLE(Sales76 - MaterialsUsed76 - Payroll76 -
     -            DeltaInventory76)/DBLE(Sales76)
```

```
                ELSE
                  PCM76 = 9999.0
                ENDIF
                IF((Sales75.ne.99999999).and.
     -            (MaterialsUsed75.ne.99999999).and.
     -            (Payroll75.ne.9999999).and.(DeltaInventory75.ne.999).and.
     -            (Sales75.ne.99999999)) then
                  PCM75 = DBLE(Sales75 - MaterialsUsed75 - Payroll75 -
     -             DeltaInventory75)/DBLE(Sales75)
                ELSE
                  PCM75 = 9999.0
                ENDIF
                IF(PCM75.ne.9999.0).and.(PCM76.ne.9999.0) then
                  PCM7576 = (PCM76 + PCM75)/2
                ELSE
                  PCM7576 = 9999.0
                ENDIF
C
C               *** Adjusted PCM ***
                IF((PCM75.ne.9999.0).and.(LBADV75.ne.9999.0).and.
     -            (LBRD75.ne.9999.0).and.(DeprToSales75.ne.9999.0)) then
                  AdjPCM75 = PCM75 - LBADV75 - LBRD75 - DeprToSales75
                ELSE
                  AdjPCM75 = 9999.0
                ENDIF
                IF((PCM76.ne.9999.0).and.(LBADV76.ne.9999.0).and.
     -            (LBRD76.ne.9999.0).and.(DeprToSales76.ne.9999.0)) then
                  AdjPCM76 = PCM76 - LBADV76 - LBRD76 - DeprToSales76
                ELSE
                  AdjPCM76 = 9999.0
                ENDIF
                IF((PCM7576.ne.9999.0).and.(LBADV7576.ne.9999.0).and.
     -            (LBRD7576.ne.9999.0).and.(DeprToSales7576.ne.9999.0)) then
                  AdjPCM7576 = PCM7576 - LBADV7576 - LBRD7576 -
     -            DeprToSales7576
                ELSE
                  AdjPCM7576 = 9999.0
                ENDIF
C
C               *** DerPCM ***
                IF((PCM75.ne.9999.0).and.(LBADV75.ne.9999.0).and.
     -            (LBRD75.ne.9999.0).and.(DeprToSales75.ne.9999.0).and.
     -            (GeneralAndAdmin75.ne.9999.0).and.
     -            (Sales75.ne.99999999)) then
                  DerPCM75 = PCM75 - LBADV75 - LBRD75 - DeprToSales75 -
     -              GenAdminToSales75
```

```
            ELSE
              DerPCM75 = 9999.0
            ENDIF
            IF((PCM76.ne.9999.0).and.(LBADV76.ne.9999.0).and.
     -        (LBRD76.ne.9999.0).and.(DeprToSales76.ne.9999.0).and.
     -        (GeneralAndAdmin76.ne.9999.0).and.
     -        (Sales76.ne.99999999)) then
              DerPCM76 = PCM76 - LBADV76 - LBRD76 - DeprToSales76 -
     -          GenAdminToSales76
            ELSE
              DerPCM75 = 9999.0
            ENDIF
            IF((PCM7576.ne.9999.0).and.(LBADV7576.ne.9999.0).and.
     -        (LBRD7576.ne.9999.0).and.(DeprToSales7576.ne.9999.0)) then
              DerPCM7576 = PCM7576 - LBADV7576 - LBRD7576 -
     -          DeprToSales7576 - GenAdminToSales7576
            ELSE
              DerPCM75 = 9999.0
            ENDIF
C
C           *** Output ***
            write(3,103) SIC,LBADV76,LBADV75,LBADV7576,KOftc75,KOftc76,
     -        KOftc7576,LBRD75,LBRD76,LBRD7576,DeprToSales75,
     -        DeprToSales76,DeprToSales7576,LBOPI75,LBOPI76,
     -        LBOPI7576,LBCU75,LBCU76,LBCU7576,
     -        PCM76,PCM75,PCM7576,LBASS75,LBASS76,LBASS7576,
     -        AdjPCM76,AdjPCM75,AdjPCM7576,
     -        DerPCM76,DerPCM75,DerPCM7576,
     -        GenAdminToSales75,GenAdminToSales76,
     -        GenAdminToSales7576
 103        format(I4,6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,
     -        3F10.4)
          ELSE
            write(*,*) 'FTCCode75: ',FTCCode75
            write(*,*) 'FTCCode76: ',FTCCode76
            PAUSE
            goto 150
          ENDIF
          write(*,*) SIC
          goto 1
 150      stop
          end
```

APPENDIX E: Master Build

```
      program Masterbuild
      IMPLICIT NONE
      integer SIC,NCO,CSIC
      double precision MID,MES,CDR,CAR,I,C4,KO75,KO76,KO7576
      double precision AdvrToSales,ExportsToSales,ImportsToSales
      double precision GROW
      double precision Payroll75,Payroll76,VAdd75,VAdd76
      double precision VShip75,VShip76,Disp
      double precision ExportsToSales,ImportsToSales,AdverToSales
      double precision FTCCode75,FTCCode76
      double precision LBADV76,LBADV75,LBADV7576
      double precision KOftc75,KOftc76,KOftc7576
      double precision LBRD75,LBRD76,LBRD7576
      double precision DeprToSales75,DeprToSales76,DeprToSales7576
      double precision LBOPI75,LBOPI76,LBOPI7576
      double precision LBCU75,LBCU76,LBCU7576
      double precision PCM75,PCM76,PCM7576
      double precision CPCM75,CPCM76,CPCM7576
      double precision INDPCM75,INDPCM76,INDPCM7576
      double precision LBASS75,LBASS76,LBASS7576
      double precision GenAdminToSales75,GenAdminToSales76
      double precision GenAdminToSales7576
      double precision INDPCM75,INDPCM76,INDPCM7576
      double precision DerINDPCM75,DerINDPCM76,DerINDPCM7576
      double precision AdjPCM75,AdjPCM76,AdjPCM7576
      double precision DerPCM75,DerPCM76,DerPCM7576
      double precision MCDR,MESD20
      character CharIn*1
      OPEN(1,FILE='DataBase',STATUS='OLD',ACCESS='SEQUENTIAL',
     -     FORM='FORMATTED',POSITION='APPEND',
     -     ACTION='READ')
      OPEN(2,FILE='FTCDataBase',STATUS='OLD',ACCESS='SEQUENTIAL',
     -       FORM='FORMATTED',
     -       ACTION='READ')
      OPEN(3,FILE='MasterData',STATUS='NEW',ACCESS='SEQUENTIAL',
     -       FORM='FORMATTED',
     -       ACTION='WRITE')
      REWIND(1)
      REWIND(2)
      REWIND(3)
1     SIC = 0
      CSIC = 0
      NCO = 0
      Disp = 0.0
      MCDR = 0.0
```

MESD20 = 0.0
Payroll76 = 0.0
Payroll75 = 0.0
VAdd76 = 0.0
VAdd75 = 0.0
VShip76 = 0.0
VShip75 = 0.0
Payroll75 = 0
Payroll76 = 0
GenAdminToSales75 = 0.0
GenAdminToSales76 = 0.0
GenAdminToSales7576 = 0.0
LBADV75 = 0.0
LBADV76 = 0.0
LBADV7576 = 0.0
KOftc75 = 0.0
KOftc76 = 0.0
KOftc7576 = 0.0
LBRD75 = 0.0
LBRD76 = 0.0
LBRD7576 = 0.0
DeprToSales75 = 0.0
DeprToSales76 = 0.0
DeprToSales7576 = 0.0
LBOPI75 = 0.0
LBOPI76 = 0.0
LBOPI7576 = 0.0
LBCU75 = 0.0
LBCU76 = 0.0
LBCU7576 = 0.0
LBCU75 = 0.0
LBCU76 = 0.0
LBCU7576 = 0.0
PCM75 = 0.0
PCM76 = 0.0
PCM7576 = 0.0
INDPCM75 = 0.0
INDPCM76 = 0.0
INDPCM7576 = 0.0
DerINDPCM75 = 0.0
DerINDPCM76 = 0.0
DerINDPCM7576 = 0.0
LBASS75 = 0.0
LBASS76 = 0.0
LBASS7576 = 0.0
MID = 0.0
MES = 0.0
CDR = 0.0

```
      CAR = 0.0
      I = 0.0
      C4 = 0.0
      KO75 = 0.0
      KO76 = 0.0
      KO7576 = 0.0
      AdvrToSales = 0.0
      ExportsToSales = 0.0
      ImportsToSales = 0.0
      GROW = 0.0
      CPCM75 = 0.0
      CPCM76 = 0.0
      CPCM7576 = 0.0
      CharIn = ' '
      read(1,101) CSIC,Disp,CPCM7576,CPCM75,CPCM76,C4,MID,MES,
     -   CDR,CAR,I,KO75,KO76,KO7576,AdvrToSales,GROW,NCO,
     -   VShip75,VShip76,Payroll75,Payroll76,VAdd75,VAdd76,
     -   ImportsToSales,ExportsToSales,MCDR,MESD20
  101 format(I4,5F10.4,/,4F10.4,/,6F10.4,I5,/,6F10.2,/,4F10.4)
      read(2,103) SIC,LBADV76,LBADV75,LBADV7576,KOftc75,KOftc76,
     -   KOftc7576,LBRD75,LBRD76,LBRD7576,DeprToSales75,
     -   DeprToSales76,DeprToSales7576,LBOPI75,LBOPI76,
     -   LBOPI7576,LBCU75,LBCU76,LBCU7576,
     -   PCM76,PCM75,PCM7576,LBASS75,LBASS76,LBASS7576,
     -   AdjPCM76,AdjPCM75,AdjPCM7576,
     -   DerPCM76,DerPCM75,DerPCM7576,
     -   GenAdminToSales75,GenAdminToSales76,
     -   GenAdminToSales7576
  103 format(I4,6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,
     -   3F10.4)
      IF(SIC.eq.CSIC).and.(SIC.ne.0).and.(CSIC.ne.0) then
C
C       *** Ravenscraft's Price-Cost Margin ***
        IF(PCM75.ne.9999.0).and.(LBADV75.ne.9999.0).and.
     -    (DeprToSales75.ne.9999.0).and.(LBRD75.ne.9999.0) then
          INDPCM75 = (CPCM75 - LBADV75 - DeprToSales75 - LBRD75)
        ELSE
          INDPCM75 = 9999.0
        ENDIF
        IF(PCM76.ne.9999.0).and.(LBADV76.ne.9999.0).and.
     -    (DeprToSales76.ne.9999.0).and.(LBRD76.ne.9999.0) then
          INDPCM76 = (CPCM76 - LBADV76 - DeprToSales76 - LBRD76)
        ELSE
          INDPCM76 = 9999.0
        ENDIF
        IF(PCM7576.ne.9999.0).and.(LBADV7576.ne.9999.0).and.
     -    (DeprToSales7576.ne.9999.0).and.(LBRD7576.ne.9999.0) then
          INDPCM7576 = (CPCM7576 - LBADV7576 - DeprToSales7576
```

```
     -          - LBRD7576)
                ELSE
                  INDPCM7576 = 9999.0
                ENDIF
C
C               *** Definitional Price - Cost Margin ***
                IF(INDPCM75.ne.9999.0).and.(GenAdminToSales75.ne.9999.0) then
                  DerINDPCM75 = INDPCM75 - GenAdminToSales75
                ELSE
                  DerINDPCM75 = 9999.0
                ENDIF
                IF(INDPCM76.ne.9999.0).and.(GenAdminToSales76.ne.9999.0) then
                  DerINDPCM76 = INDPCM76 - GenAdminToSales76
                ELSE
                  DerINDPCM76 = 9999.0
                ENDIF
                IF(INDPCM7576.ne.9999.0).and.
     -            (GenAdminToSales7576.ne.9999.0) then
                  DerINDPCM7576 = INDPCM7576 - GenAdminToSales7576
                ELSE
                  DerINDPCM7576 = 9999.0
                ENDIF
                write(3,105) SIC,
     -            AdvrToSales,LBADV76,LBADV75,LBADV7576,
     -            KO75,KO76,KO7576,KOftc75,KOftc76,KOftc7576,
     -            LBRD75,LBRD76,LBRD7576,
     -            DeprToSales75,DeprToSales76,DeprToSales7576,
     -            LBOPI75,LBOPI76,LBOPI7576,LBCU75,LBCU76,LBCU7576,
     -            LBASS75,LBASS76,LBASS7576,
     -            MID,MES,CDR,CAR,MCDR,MESD20,
     -            CPCM7576,CPCM75,CPCM76,PCM76,PCM75,PCM7576,
     -            INDPCM75,INDPCM76,INDPCM7576,
     -            DerINDPCM75,DerINDPCM76,DerINDPCM7576,
     -            AdjPCM75,AdjPCM76,AdjPCM7576,DerPCM75,DerPCM76,
     -            DerPCM7576,Disp,C4,I,ExportsToSales,ImportsToSales,GROW,
     -            NCO
  105           format(I4,4F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,3F10.4,/,
     -            6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,/,6F10.4,I5)
                write(*,*) SIC
                goto 1
              ELSE
                write(*,*) 'CSIC :',CSIC
                write(*,*) 'SIC  :',SIC
                PAUSE
              ENDIF
  150       STOP
            end
```

Appendix F: Master Data Base

Note: **** denotes value not given.

SIC	CPCM7576	CPCM75	CPCM76	LBOP175	LBOP176	LBOP156
2026	.1438	.1448	.1429	.0238	.0236	.0237
2032	.3045	.3054	.3036	.1156	.1208	.1182
2037	.2756	.2522	.2990	.0357	.0581	.0469
2038	.2203	.2085	.2321	.0538	.0680	.0609
2043	.4388	.4174	.4602	.1774	.1765	.1769
2047	.3348	.3241	.3455	.1148	.0966	.1057
2048	.1398	.1342	.1454	.0431	.0497	.0464
2046	.2832	.3315	.2349	.1836	.0757	.1296
2051	****	****	****	.0458	.0460	.0459
2052	.3819	.3686	.3953	.1036	.1249	.1142
2063	.2691	.3212	.2170	.1543	.0543	.1043
2065	.2724	.2609	.2839	.0862	.1025	.0944
2066	.2544	.2442	.2647	.0961	.1050	.1006
2067	.4545	.4551	.4539	.1550	****	****
2085	.4245	.4282	.4209	.1105	.0884	.0994
2086	.2476	.2455	.2496	.0503	.0603	.0553
2087	.4409	.4126	.4692	.1479	.1931	.1705
2095	.2710	.3032	.2388	.0465	.0242	.0354
2253	.2273	.2356	.2189	.1137	.0822	.0979
2254	.1749	.1847	.1651	.0596	.0934	.0765
2641	.2840	.2902	.2779	.0978	.1148	.1063
2642	.2277	.2329	.2225	.0594	.0492	.0543
2643	.2435	.2461	.2409	.0815	.0704	.0759
2647	.3130	.3154	.3105	.1085	.1227	.1156
2648	.2597	.2398	.2795	.1331	.0961	.1146
2813	.4800	.4846	.4753	.1386	.1661	.1524
2816	.3101	.3077	.3124	.0502	.1003	.0752
2821	.2862	.2838	.2885	.0859	.1121	.0990
2822	.2097	.2206	.1988	-.0160	.0159	-.0001
2844	.5745	.5662	.5829	.1189	.1246	.1218
2879	.4426	.4617	.4234	.2222	.1690	.1956
2892	.3323	.3106	.3540	.1177	.0572	.0875
3221	.3430	.3554	.3306	.0796	.0742	.0769
3229	.4174	.4180	.4168	.0609	.1178	.0893
3261	.3647	.3687	.3608	.0838	.0967	.0902

SIC	CPCM7576	CPCM75	CPCM76	LBOP175	LBOP176	LBOP156
3264	.3079	.2965	.3193	.0994	.1107	.1050
3273	.2326	.2300	.2352	-.0031	-.0007	-.0019
3274	.3299	.3300	.3297	.1015	.1475	.1245
3275	.2408	.2449	.2366	.0640	.0661	.0651
3291	.3303	.3277	.3328	.1377	.1561	.1469
3292	.3122	.3016	.3227	.0984	.0750	.0867
3296	.3590	.3551	.3629	.1193	.1511	.1352
3331	.0965	.0453	.1477	-.0581	.0399	-.0091
3332	.1352	.1175	.1529	.0921	.1310	.1115
3333	.1988	.2321	.1656	.0669	.0669	.0669
3334	.2722	.2838	.2607	.0412	.0647	.0529
3339	.3624	.5055	.2193	.1831	.0920	.1375
3357	.2062	.2141	.1983	.0967	.0687	.0827
3411	.2448	.2430	.2465	.0664	.0707	.0685
3412	.2240	.2204	.2276	.0733	.0748	.0740
3421	.4701	.4654	.4749	.2550	.2523	.2536
3429	.3069	.2922	.3215	.1085	.1278	.1182
3431	.2642	.2540	.2743	.0083	.0527	.0305
3432	.3062	.2900	.3224	.1404	.1528	.1466
3433	.2521	.2367	.2675	.0022	.0443	.0232
3441	.2348	.2494	.2201	.1281	.1239	.1260
3442	.2315	.2251	.2378	-.0189	.0628	.0220
3443	.2694	.2580	.2807	.0456	.0479	.0467
3465	.2284	.2200	.2367	.0786	.0880	.0833
3466	.2713	.2703	.2724	.0949	.1101	.1025
3469	.2553	.2537	.2568	.0965	.1225	.1095
3494	.3246	.3272	.3221	.1098	.1063	.1080
3511	.2766	.2591	.2941	.0175	.0446	.0311
3519	.2235	.2165	.2305	.0603	.0878	.0741
3523	.2679	.2613	.2745	.1056	.1164	.1110
3524	.2143	.1950	.2335	.0303	.0576	.0440
3531	.2475	.2513	.2436	.0909	.0870	.0889
3532	.2654	.3018	.2290	.1368	.1251	.1310
3533	.4022	.4226	.3818	.1675	.1408	.1542
3534	.2475	.2588	.2362	-.0045	-.0004	-.0024
3535	.2809	.2699	.2920	.0676	.0974	.0825
3536	.2721	.2617	.2826	.1180	.1096	.1138
3537	.1860	.1754	.1965	-.0658	.0058	-.0300
3541	.3088	.2896	.3280	.1016	.0968	.0992

SIC	CPCM7576	CPCM75	CPCM76	LBOP175	LBOP176	LBOP156
3545	.3374	.3354	.3393	.0955	.0909	.0932
3546	.3744	.3624	.3863	.0920	.1004	.0962
3551	.2614	.2697	.2532	.0577	.0920	.0749
3552	.2722	.2818	.2626	-.0827	-.0421	-.0624
3553	.3009	.3159	.2859	.0976	.1121	.1049
3554	.2229	.2231	.2226	.0827	.1486	.1157
3555	.2657	.2624	.2690	-.0054	.0190	.0068
3559	.2954	.2897	.3011	.0460	.0629	.0545
3561	.2968	.2938	.2999	.1494	.1323	.1409
3562	.2782	.2757	.2806	.0679	.0672	.0675
3563	.3052	.3105	.2998	.0788	.1028	.0908
3564	.2857	.2717	.2997	.0706	.0896	.0801
3566	.3442	.3346	.3538	.1777	.1823	.1800
3567	.2797	.2764	.2830	.0825	.1039	.0932
3568	.3292	.3233	.3351	.1300	.1187	.1244
3573	.3161	.2801	.3520	.1348	.1644	.1496
3574	.1723	.1712	.1734	.0809	.0268	.0538
3576	.4066	.3894	.4238	.0918	.1274	.1096
3585	.2637	.2423	.2851	.0066	.0581	.0324
3612	.2693	.2614	.2772	.0272	.0701	.0487
3613	.3376	.3255	.3498	.0887	.1046	.0967
3621	.2975	.2768	.3182	.0906	.0909	.0908
3622	.3062	.2943	.3180	.0863	.0828	.0846
3623	.2538	.2629	.2447	.1083	.0573	.0828
3624	.3858	.4150	.3565	.1830	.1610	.1720
3629	.2894	.2748	.3040	.0909	.0728	.0819
3631	.2770	.2559	.2982	.0247	.0626	.0437
3632	.2504	.2210	.2798	.0479	.0503	.0491
3633	.2899	.2654	.3144	.0668	.0820	.0744
3635	.3712	.3443	.3980	.1146	.1328	.1237
3641	.4721	.4767	.4675	.1512	.1766	.1639
3651	.2245	.1910	.2580	.0158	.0460	.0309
3652	.3602	.3512	.3693	.0926	.0661	.0794
3674	.3161	.2996	.3325	-.0320	.0312	-.0004
3691	.2699	.2566	.2832	.0515	.0758	.0636
3692	.3850	.3709	.3991	.1619	.1997	.1808
3694	.2940	.2673	.3207	.1466	.1486	.1476
3714	.2390	.2280	.2500	.0943	.1175	.1059
3715	.1892	.1833	.1952	-.0125	.0040	-.0042

SIC	CPCM7576	CPCM75	CPCM76	LBOP175	LBOP176	LBOP156
3724	.2599	.2542	.2656	.0672	.0734	.0703
3792	.1564	.1438	.1690	.0606	.0559	.0583
3843	.3242	.3197	.3288	.0748	.0426	.0587
3949	.2989	.2803	.3175	.0658	.0872	.0765

SIC	INDPCM 75	INDPCM 76	INDPCM 7576	Disp	C_4	I
2026	.1261	****	****	.1282	.1790	.6348
2032	.2413	.2357	.2385	.2014	.6300	.8140
2037	.1870	.2354	.2111	.7582	.2230	.5561
2038	.1537	.1757	.1647	.1464	.4000	.7246
2043	.2941	.3259	.3099	****	.8860	.9022
2047	.2075	.2133	.2103	.5748	.5840	.7913
2048	.1117	.1225	.1171	.3725	.2220	.7351
2046	.2724	.1601	.2162	****	.6260	.7050
2051	****	****	****	.1133	.3300	.8168
2052	****	.3548	****	.0877	.5870	.8632
2063	.3002	.1821	.2411	****	.6700	.7082
2065	.2204	.2422	.2313	.2147	.3830	.7753
2066	.2097	.2306	.2201	****	.7280	.8254
2067	.3038	****	****	****	.9300	.9403
2085	.2896	.2865	.2880	****	.5220	.7321
2086	.1903	.1907	.1905	.2570	.1480	.6667
2087	.3218	-5.8088	-2.7435	.2167	.6440	.9083
2095	.2527	.1955	.2240	.4464	.6120	.8418
2253	****	.1999	****	.7946	.1700	.6296
2254	.1467	.1283	.1374	****	.4210	.7197
2641	.2392	.2317	.2354	.5628	.2960	.6637
2642	.2063	.1980	.2022	.1580	.2820	.6483
2643	.2116	.2123	.2119	.3720	.2640	.6600
2647	.2303	.2256	.2280	.2060	.6500	.7757
2648	.2202	.2554	.2378	.2973	.3820	.7655
2813	.3889	.3816	.3853	.2390	.6540	.7776
2816	.2058	.2246	.2152	.4640	.5400	.6888
2821	.1975	.2161	.2068	.2526	.2220	.6082
2822	.1292	.1145	.1219	1.0190	.5980	.7170
2844	.3940	.4061	.4001	.4380	.4040	.7266

SIC	INDPCM 75	INDPCM 76	INDPCM 7576	Disp	C_4	I
2879	.3651	.3105	.3378	.3213	.4400	.6929
2892	.2706	.3159	.2933	.3310	.6430	.8098
3221	****	****	****	.1080	.5370	.7141
3229	.3219	.3272	.3246	.2613	.6130	.7849
3261	.3275	.3224	.3249	.0550	.6230	.7552
3264	.2401	.2582	.2491	.6760	.4830	.7523
3273	****	****	****	.2060	.0490	.6049
3274	.2510	.2555	.2533	.2980	.3490	.6938
3275	.1934	.1922	.1928	.3600	.7870	.8611
3291	.2809	.2830	.2820	.6500	.5790	.8867
3292	.2504	.2701	.2603	.2394	.4220	.6646
3296	.2844	.3012	.2929	.2210	.7190	.8489
3331	-.0252	.0854	.0301	1.2680	.7680	.7680
3332	.0931	.1224	.1077	.5020	1.0000	1.0000
3333	.1732	.1128	.1429	.4990	.8060	.8060
3334	.2124	.2021	.2072	.9640	.7620	.8185
3339	.4441	.1598	.3021	.4703	.5640	.7402
3357	.1757	.1622	.1689	.3360	.3980	.7316
3411	.2073	.2125	.2099	.1530	.5910	.8008
3412	.2033	.2113	.2073	.1100	.3350	.7189
3421	****	.2723	****	1.1750	.5290	.8138
3429	.2461	.2710	.2586	.4233	.3870	.8677
3431	.2203	.2410	.2307	.5980	.5420	.7959
3432	.2288	.2778	.2533	.2230	.3290	.6687
3433	.1854	.2243	.2048	.2594	.1380	.5391
3441	****	****	****	.1180	.1040	.6887
3442	.1995	.2159	.2078	.1360	.0810	.5436
3443	.2035	.2235	.2135	.2170	.2600	.8100
3465	.1864	.2026	.1945	.9700	.6490	.9338
3466	.1903	.2377	.2140	.1370	.5290	.7297
3469	.2106	.2107	.2107	.4259	.0910	.5796
3494	.2898	.2821	.2860	.1513	.1260	.6117
3511	.1905	.2274	.2090	.9530	.8610	.8895
3519	.1434	.1487	.1460	****	.4880	.6981
3523	.2222	.2302	.2262	.8640	.4620	.7624
3524	.1365	.1746	.1556	.7290	.2990	.5897
3531	.1961	.1766	.1864	.8790	.4740	.8007

SIC	INDPCM 75	INDPCM 76	INDPCM 7576	Disp	C_4	I
3532	.2697	.1947	.2322	.1450	.3690	.7336
3533	.3977	.3524	.3751	1.1210	.2990	.6659
3534	.2264	****	****	.5550	.5150	.7574
3535	.2392	.2603	.2497	.2910	.1940	.6532
3536	.2280	.2476	.2378	.4400	.1630	.5452
3537	.1070	.1333	.1202	.2370	.4510	.7430
3541	.2475	.2772	.2624	.5570	.2220	.6416
3545	.2996	.3045	.3021	.5690	.2010	.6422
3546	.2960	.3234	.3098	.2420	.4980	.7114
3551	.2268	.2102	.2183	.3000	.1430	.6034
3552	.2241	.2046	.2143	.8960	.2230	.6408
3553	.2584	.2100	.2342	.3380	.3490	.7603
3554	.1894	.1900	.1898	.4590	.4040	.7814
3555	.2151	.2122	.2136	.4980	.3960	.7984
3559	.2449	.2595	.2522	.1400	.1330	.6552
3561	.2445	.2490	.2467	.2910	.1710	.5897
3562	.2169	.2229	.2199	.5680	.5620	.7871
3563	.2612	.2642	.2627	.3660	.4470	.6952
3564	.2471	.2735	.2603	.2650	.1670	.5986
3566	.3000	.3127	.3064	.6285	.2860	.6859
3567	.2496	.2551	.2523	.4320	.2580	.6565
3568	.2793	.2828	.2810	****	.2600	.5936
3573	.0854	.1738	.1296	.6280	.4290	.7620
3574	.0604	.0367	.0486	.2300	.5910	.7138
3576	.3502	.3763	.3632	.5830	.5030	.7610
3585	.1879	.2385	.2132	.2843	.3540	.7390
3612	.2187	.2355	.2271	.2410	.5570	.7980
3613	.2865	.3082	.2973	.3800	.5080	.7864
3621	.2293	.2812	.2553	.2170	.4180	.7642
3622	.2561	.2757	.2660	.2340	.4210	.7825
3623	.2340	.2074	.2208	.5830	.4730	.7322
3624	.3488	.2867	.3179	.4680	.8020	.9093
3629	.2204	.2575	.2389	****	.2810	.6475
3631	.1942	.2359	.2151	.8150	.5090	.7139
3632	.1808	.2389	.2099	.6620	.8160	.8344
3633	.2153	.2737	.2445	.8860	.8900	****
3635	.2867	.3366	.3117	.4580	.8260	.8667

SIC	INDPCM 75	INDPCM 76	INDPCM 7576	Disp	C_4	I
3641	****	.3975	****	.4090	.8960	.9442
3651	.1317	.1996	.1656	.5390	.5060	.7797
3652	.2684	.2897	.2791	.2820	.4820	.7762
3674	.1590	.2179	.1885	.5280	.4200	.6796
3691	.2037	.2304	.2171	.1160	.5710	.6790
3692	.2854	.3178	.3016	.2900	.8680	.9214
3694	.2266	.2856	.2560	.9420	.6200	.8267
3714	.1931	.2166	.2047	.9040	.6220	.8898
3715	****	****	****	.1550	.4270	.7584
3724	.1470	.1671	.1570	****	.7420	.8668
3792	.1216	****	****	****	.3120	.7091
3843	.2587	.2494	.2539	.5630	.3260	.7026
3949	.2158	.2528	.2342	****	.2050	.7295

SIC	KO75	KO76	KO7576	KOftc 75	KOftc 76	KOftc 7576
2026	.1555	.1414	.1484	.1942	.1897	.1920
2032	.2436	.2316	.2376	.3510	.3706	.3608
2037	.2914	.2821	.2867	.3756	.3635	.3696
2038	.2348	.2251	.2300	.3342	.3295	.3319
2043	.2392	.2705	.2548	.3356	.3701	.3529
2047	.2976	.2656	.2816	.3405	.3282	.3344
2048	.1496	.1407	.1451	.2146	.2077	.2111
2046	.4986	.5957	.5471	.5767	.7123	.6445
2051	****	****	****	.3555	.3737	.3646
2052	.2428	.2514	.2471	.3119	.3275	.3197
2063	.3755	.5091	.4423	.4460	.8336	.6398
2065	.2373	.2352	.2363	.2608	.2592	.2600
2066	.2298	.2215	.2256	.2749	.2754	.2751
2067	.3176	.3172	.3174	.4353	****	****
2085	.2764	.2722	.2743	.4260	.4234	.4247
2086	.2714	.2828	.2771	.3326	.3417	.3372
2087	.1277	.1455	.1366	.2309	.2583	.2446
2095	.1687	.1205	.1446	.2139	.1731	.1935
2253	.2226	.2110	.2168	.3678	.3164	.3421
2254	.2206	.2268	.2237	.4193	.3595	.3894
2641	.3607	.2976	.3291	.6126	.5317	.5722

SIC	K075	K076	K07576	K0ftc 75	K0ftc 76	K0ftc 7576
2642	.3161	.3089	.3125	.4256	.3607	.3931
2643	.2891	.2870	.2881	.3782	.3566	.3674
2647	.2273	.2187	.2230	.7888	.7822	.7855
2648	.2253	.2170	.2211	.2919	.2789	.2854
2813	1.3675	1.2849	1.3262	1.5193	1.5476	1.5334
2816	.8801	.7051	.7926	1.1962	1.0036	1.0999
2821	.7281	.6119	.6700	.9436	.8060	.8748
2822	.4690	.4242	.4466	.9358	.8165	.8762
2844	.1556	.1380	.1468	.2219	.2046	.2132
2879	.3338	.3865	.3601	.4437	.4896	.4666
2892	****	****	****	.4410	.4615	.4513
3221	.5202	.5415	.5309	.5742	.5690	.5716
3229	.7503	.6703	.7103	.9791	.8535	.9163
3261	.5200	.4687	.4943	.7557	.5921	.6739
3264	.6075	.5991	.6033	.6430	.7385	.6907
3273	.4630	.4308	.4469	.4603	.4482	.4542
3274	.9887	.8944	.9415	1.3707	1.1875	1.2791
3275	.9474	.7594	.8534	1.2954	1.1515	1.2235
3291	.4019	.3469	.3744	.6020	.5326	.5673
3292	.4808	.4144	.4476	.5209	.4925	.5067
3296	.6271	.5399	.5835	.7895	.6894	.7395
3331	.3559	.3124	.3342	2.1816	2.1739	2.1777
3332	.1867	.2243	.2055	.4775	.5291	.5033
3333	.4562	.4572	.4567	1.0470	1.0306	1.0388
3334	.9977	.7876	.8926	1.4425	1.1486	1.2956
3339	1.1271	.8573	.9922	1.0990	1.3654	1.2322
3357	.3994	.3600	.3797	.5160	.5034	.5097
3411	.3157	.2909	.3033	.4569	.4143	.4356
3412	.3170	.3048	.3109	.4001	.4102	.4051
3421	.3158	.2869	.3013	.4445	.4455	.4450
3429	.3617	.3034	.3325	.4317	.4076	.4197
3431	.4260	.3144	.3702	.6027	.4655	.5341
3432	.3078	.2546	.2812	.3305	.3199	.3252
3433	.2796	.2269	.2532	.4011	.3648	.3830
3441	.2228	.2338	.2283	****	****	****
3442	.2095	.1972	.2033	.3393	.2977	.3185
3443	.2649	.2766	.2707	.3535	.3547	.3541
3465	.5427	.4135	.4781	.4346	.3689	.4017

SIC	K075	K076	K07576	KOftc 75	KOftc 76	KOftc 7576
3466	.3201	.2894	.3048	.4417	.3854	.4136
3469	.3379	.3070	.3225	.3966	.3246	.3606
3494	.3239	.3386	.3313	.4174	.4325	.4249
3511	.4548	.4305	.4426	.5223	.4851	.5037
3519	.3522	.3366	.3444	.4628	.4654	.4641
3523	.2105	.2077	.2091	.2509	.2670	.2589
3524	.1983	.2063	.2023	.2495	.2531	.2513
3531	.2623	.3045	.2834	.3604	.4299	.3952
3532	.2276	.2203	.2239	.2330	.2542	.2436
3533	.2857	.3320	.3088	.2273	.3015	.2644
3534	.3335	.3598	.3466	.3292	.3657	.3475
3535	.1978	.2037	.2008	.2429	.2452	.2441
3536	.2450	.2351	.2401	.2820	.3198	.3009
3537	.2983	.3056	.3020	.4535	.4291	.4413
3541	.3436	.4004	.3720	.3825	.4289	.4057
3545	.3776	.3598	.3687	.4141	.4282	.4211
3546	.2593	.2497	.2545	.3934	.3356	.3645
3551	.2804	.2851	.2827	.3474	.3824	.3649
3552	.4051	.3926	.3989	.7141	.8410	.7776
3553	.2386	.2548	.2467	.3905	.3392	.3649
3554	.2776	.2798	.2787	.3021	.3338	.3179
3555	.3001	.2789	.2895	.3726	.3502	.3614
3559	.2680	.2655	.2668	.3040	.3377	.3209
3561	.3051	.3038	.3044	.3840	.3839	.3840
3562	.5699	.5606	.5653	.7165	.6799	.6982
3563	.2311	.2237	.2274	.2718	.2649	.2684
3564	.2543	.2417	.2480	.2700	.2772	.2736
3566	.4099	.4274	.4187	.4010	.4384	.4197
3567	.2230	.2223	.2226	.2714	.2553	.2634
3568	.3615	.3923	.3769	.4145	.4483	.4314
3573	.2608	.2265	.2436	.9765	.8934	.9349
3574	.3045	.2978	.3011	.0830	.4431	.2630
3576	.2119	.1960	.2040	.2360	.2405	.2382
3585	.3005	.2499	.2752	.3571	.2970	.3270
3612	.3276	.3168	.3222	.4404	.4370	.4387
3613	.2488	.2435	.2461	.2865	.2848	.2856
3621	.3602	.3390	.3496	.4291	.3978	.4135
3622	.2660	.2418	.2539	.2689	.2592	.2641

SIC	KO75	KO76	KO7576	KOftc 75	KOftc 76	KOftc 7576
3623	.1959	.2149	.2054	.2337	.2814	.2575
3624	.7405	.7226	.7315	.8626	.8893	.8760
3629	.3176	.2906	.3041	.4549	.4391	.4470
3631	.2859	.2330	.2595	.3225	.2615	.2920
3632	.2216	.2432	.2324	.2539	.2549	.2544
3633	.2866	.2695	.2781	.3112	.2566	.2839
3635	.2933	.2665	.2799	.2457	.2458	.2458
3641	.4270	.3702	.3986	.6551	.5874	.6213
3651	.1509	.1355	.1432	.1860	.1686	.1773
3652	.2623	.2298	.2461	.2173	.2005	.2089
3674	.6638	.5249	.5944	.6220	.5133	.5677
3691	.3225	.3174	.3200	.4350	.4158	.4254
3692	.2962	.2475	.2718	.3221	.3207	.3214
3694	.3407	.2866	.3136	.3197	.2926	.3061
3714	.4484	.3485	.3985	.3609	.3012	.3311
3715	.2961	.1936	.2448	.5840	.4618	.5229
3724	.3436	.3358	.3397	.3281	.3131	.3206
3792	.1173	.0925	.1049	.1152	.1030	.1091
3843	.2000	.2049	.2024	.2677	.2678	.2677
3949	.2451	.2459	.2455	.4071	.3819	.3945

SIC	AdvrTo Sales	LBADV 76	LBADV 75	LBADV 7576	GROW
2026	.0054	.0077	.0072	.0075	.4673
2032	.0410	.0444	.0421	.0432	.5076
2037	.0285	.0373	.0399	.0386	.7836
2038	.0126	.0350	.0337	.0343	.7589
2043	.1017	.1084	.1015	.1050	1.2190
2047	.0608	.1065	.0918	.0992	1.2018
2048	.0069	.0051	.0047	.0049	.7444
2046	.0008	.0408	.0310	.0359	1.4208
2051	.0165	.0228	.0199	.0214	.5125
2052	.0106	.0233	.0195	.0214	.6788
2063	.0069	.0012	.0008	.0010	.3425
2065	.0386	.0260	.0251	.0255	.8194
2066	.0193	.0209	.0207	.0208	1.2151
2067	.0540	****	.1233	****	.4807

SIC	AdvrTo Sales	LBADV 76	LBADV 75	LBADV 7576	GROW
2085	.0775	.1134	.1185	.1159	.2771
2086	.0222	.0340	.0310	.0325	.8349
2087	.0047	.0930	.0703	.0816	.7060
2095	.0051	.0279	.0332	.0306	1.4118
2253	.0027	.0046	.0072	.0059	.3710
2254	.0032	.0163	.0163	.0163	.1915
2641	.0046	.0046	.0053	.0049	.7359
2642	.0000	.0015	.0019	.0017	.5955
2643	.0107	.0046	.0053	.0050	.8467
2647	.0275	.0335	.0334	.0335	1.3753
2648	.0101	.0061	.0043	.0052	.4466
2813	****	.0027	.0029	.0028	.8175
2816	****	.0031	.0032	.0032	.5810
2821	.0187	.0026	.0029	.0028	1.4157
2822	.0000	.0039	.0042	.0040	.7104
2844	.1840	.1431	.1381	.1406	.6161
2879	.0143	.0308	.0218	.0263	1.4161
2892	.0000	.0021	.0017	.0019	.6546
3221	.0030	.0358	.0297	.0328	.7231
3229	.0271	.0133	.0117	.0125	.6729
3261	.0039	.0104	.0108	.0106	.5237
3264	.0000	.0043	.0032	.0038	.3383
3273	.0010	.0006	.0004	.0005	.5899
3274	.0000	.0014	.0012	.0013	1.0336
3275	.0000	.0039	.0047	.0043	.5618
3291	.0068	.0063	.0051	.0057	1.2022
3292	.0027	.0166	.0151	.0158	.1555
3296	.0012	.0122	.0119	.0120	1.3703
3331	.0016	.0001	.0002	.0002	.4139
3332	.0101	.0041	.0000	.0020	.5179
3333	.0000	.0082	.0066	.0074	.1443
3334	.0013	.0024	.0032	.0028	1.3716
3339	.0024	.0019	.0012	.0015	1.4347
3357	.0045	.0013	.0017	.0015	.4948
3411	.0000	.0004	.0003	.0003	.8273
3412	.0000	.0001	.0001	.0001	1.0314
3421	.1600	.1254	.1280	.1267	.6641
3429	.0002	.0106	.0086	.0096	.6060

SIC	AdvrTo Sales	LBADV 76	LBADV 75	LBADV 7576	GROW
3431	.0077	.0121	.0129	.0125	.2901
3432	.0034	.0158	.0288	.0223	.6470
3433	.0090	.0093	.0111	.0102	.3639
3441	.0030	.0004	.0005	.0004	.4044
3442	.0038	.0047	.0041	.0044	.5092
3443	.0016	.0021	.0015	.0018	1.2259
3465	.0011	.0092	.0092	.0092	.8425
3466	.0007	.0018	.0371	.0194	.5630
3469	.0020	.0223	.0199	.0211	.7613
3494	.0014	.0073	.0068	.0070	.9149
3511	.0000	.0015	.0013	.0014	.2470
3519	.0034	.0057	.0061	.0059	1.3193
3523	.0000	.0061	.0058	.0059	1.2690
3524	.0102	.0247	.0250	.0249	.4874
3531	.0023	.0045	.0045	.0045	1.0733
3532	.0030	.0053	.0049	.0051	1.5891
3533	.0079	.0034	.0031	.0032	2.2254
3534	.0000	****	.0008	****	.0126
3535	.0045	.0075	.0083	.0079	.9606
3536	.0000	.0071	.0060	.0065	.5854
3537	.0000	.0048	.0063	.0055	.8545
3541	.0022	.0083	.0061	.0072	.9879
3545	.0000	.0049	.0036	.0043	.9177
3546	.0047	.0236	.0255	.0245	1.2220
3551	.0000	.0049	.0052	.0051	.7866
3552	.0000	.0054	.0049	.0052	.1545
3553	.0000	.0305	.0293	.0299	.1826
3554	.0000	.0033	.0053	.0043	.8466
3555	.0000	.0083	.0068	.0075	.6404
3559	.0000	.0049	.0039	.0044	.3860
3561	.0085	.0043	.0041	.0042	.9682
3562	.0025	.0041	.0042	.0041	.6774
3563	.0154	.0038	.0042	.0040	1.4180
3564	.0041	.0056	.0057	.0057	.7767
3566	.0091	.0068	.0059	.0063	.9319
3567	.0004	.0036	.0041	.0039	.6839
3568	.0068	.0047	.0041	.0044	.8553
3573	.0011	.0044	.0048	.0046	.9971

SIC	AdvrTo Sales	LBADV 76	LBADV 75	LBADV 7576	GROW
3574	.0058	.0250	.0282	.0266	.3342
3576	.0092	.0083	.0080	.0082	.7370
3585	.0018	.0107	.0111	.0109	.3606
3612	.0010	.0020	.0018	.0019	.5111
3613	.0000	.0053	.0054	.0053	.6777
3621	.0000	.0018	.0018	.0018	.7839
3622	.0000	.0047	.0051	.0049	.7635
3623	.0044	.0092	.0075	.0083	.8035
3624	.0000	.0021	.0015	.0018	.9481
3629	.0000	.0028	.0034	.0031	.5407
3631	.0374	.0327	.0260	.0293	.8166
3632	.0107	.0102	.0105	.0103	.4983
3633	.0237	.0094	.0093	.0093	.3216
3635	.0345	.0335	.0296	.0315	.3682
3641	.0082	.0154	.0150	.0152	.5072
3651	.0213	.0310	.0289	.0300	.2909
3652	.0162	.0644	.0671	.0657	1.0816
3674	.0031	.0047	.0056	.0051	.9695
3691	.0063	.0069	.0064	.0067	1.0468
3692	.0087	.0310	.0304	.0307	.9135
3694	.0019	.0000	.0000	.0000	.7922
3714	.0008	.0066	.0053	.0060	.9500
3715	.0063	.0102	.0102	.0102	.7087
3724	.0007	.0011	.0005	.0008	.7231
3792	.0039	.0091	.0082	.0086	.1790
3843	.0153	.0197	.0196	.0197	.9225
3949	.0334	.0371	.0352	.0362	.4024

SIC	MID	MES	CDA	CAA	MCDA	MESD20
2026	.0017	.0020	.8597	.7512	.0000	.0000
2032	.0185	.0496	.9306	1.1678	.0000	.0000
2037	.0088	.0127	-.9874	.8797	.0088	.0127
2038	.0094	.0215	.9078	.6057	.0000	.0000
2043	****	****	****	1.0339	****	****
2047	.0280	.0316	.5653	2.0962	.0280	.0316
2048	.0008	.0015	.7991	1.5273	.0000	.0015
2046	****	****	****	1.6860	****	****

SIC	MID	MES	CDR	CAR	MCDR	MES020
2051	.0023	.0025	.7426	1.1914	.0023	.0025
2052	.0215	.0284	.7582	1.9256	.0000	.0284
2063	.2913	.0079	-1.1272	.6224	.2913	.0079
2065	.0062	.0172	.5644	.8615	.0062	.0172
2066	****	****	****	2.0470	****	****
2067	****	****	****	3.2667	****	****
2085	.0244	.0352	****	2.3447	.0000	.0000
2086	.0014	.0019	.8255	.7774	.0000	.0000
2087	.0077	.0130	1.2597	2.5017	.0000	.0000
2095	****	****	****	.9007	****	****
2253	.0046	.0113	.6731	.9006	.0046	.0113
2254	.0343	.0589	****	.7718	.0000	.0000
2641	.0079	.0165	.5976	1.6879	.0079	.0165
2642	.0069	.0097	1.0657	.9225	.0000	.0000
2643	.0031	.0075	.9234	1.0291	.0000	.0000
2647	.0257	.0330	****	1.4476	.0000	.0000
2648	.0132	.0237	.9929	1.0621	.0000	.0000
2813	.0042	.0069	1.0424	1.3130	.0000	.0000
2816	.0289	.0534	****	1.5866	.0000	.0000
2821	.0068	.0118	-.9658	.9179	.0068	.0118
2822	****	****	****	1.1257	****	****
2844	.0163	.0196	.8510	2.0486	.0000	.0000
2879	****	****	****	1.5208	****	****
2892	****	****	****	1.2157	****	****
3221	.0104	.0130	-.9714	.9471	.0104	.0130
3229	.0173	.0247	.9934	1.1687	.0000	.0000
3261	.0389	.0579	****	1.3738	.0000	.0000
3264	.0306	.0784	****	1.1171	.0000	.0000
3273	.0003	.0006	1.0338	1.0036	.0000	.0000
3274	.0236	.0226	****	.7995	.0000	.0000
3275	.0144	.0144	****	1.0016	.0000	.0000
3291	****	****	****	1.4584	****	****
3292	.0274	.0315	-1.0409	1.7090	.0274	.0315
3296	****	****	****	1.4842	****	****
3331	.0581	.0581	-1.0003	2.2747	.0581	.0581
3332	****	****	****	****	****	****
3333	****	****	****	1.8831	****	****
3334	.0298	.0415	-1.0945	1.2472	.0298	.0415
3339	****	****	****	2.5864	****	****

SIC	MID	MES	CDR	CAR	MCDR	MESD20
3357	.0042	.0089	.7836	1.2171	.0000	.0089
3411	.0058	.0069	1.4707	.8505	.0000	.0000
3412	.0123	.0153	1.0335	.9567	.0000	.0000
3421	.0751	.0751	-1.0119	2.5598	.0751	.0751
3429	.0060	.0185	.6865	1.5668	.0060	.0185
3431	.0354	.1167	-1.0612	1.2961	.0354	.1167
3432	.0178	.0261	.8725	1.6738	.0000	.0000
3433	.0059	.0131	.9791	.7976	.0000	.0000
3441	.0016	.0025	.9633	1.0443	.0000	.0000
3442	.0025	.0037	.9635	1.3122	.0000	.0000
3443	.0026	.0060	.6688	1.1188	.0026	.0060
3465	.0305	.0305	.8212	1.3030	.0000	.0000
3466	.0253	.0554	****	1.3597	.0000	.0000
3469	.0015	.0027	.8631	.8167	.0000	.0000
3494	.0031	.0054	1.0754	1.3359	.0000	.0000
3511	.1292	.0483	****	1.0687	.0000	.0000
3519	.0177	.0623	.7888	1.0794	.0000	.0623
3523	.0154	.0451	.6466	1.0506	.0154	.0451
3524	.0236	.0323	-1.0855	.8939	.0236	.0323
3531	.0101	.0273	.8220	1.3805	.0000	.0000
3532	.0116	.0235	.9569	1.0863	.0000	.0000
3533	.0123	.0223	.9613	.9137	.0000	.0000
3534	.0548	.0520	-1.1226	2.2292	.0548	.0520
3535	.0044	.0102	.7052	.8638	.0044	.0102
3536	.0102	.0249	1.0263	1.1766	.0000	.0000
3537	.0268	.0478	.8130	1.0760	.0000	.0000
3541	.0071	.0178	.9080	.9600	.0000	.0000
3545	.0026	.0071	.8672	1.0986	.0000	.0000
3546	.0274	.0490	****	1.1780	.0000	.0000
3551	.0043	.0087	.9006	.8631	.0000	.0000
3552	.0067	.0142	1.0560	.7922	.0000	.0000
3553	****	****	****	1.1346	****	****
3554	.0180	.0492	.7188	1.5677	.0180	.0492
3555	.0174	.0256	.7584	1.4327	.0000	.0256
3559	.0021	.0075	.8236	1.1652	.0000	.0000
3561	.0057	.0119	1.0114	1.1516	.0000	.0000
3562	.0119	.0448	****	1.0435	.0000	.0000
3563	.0257	.0441	.8700	1.1320	.0000	.0000
3564	.0056	.0142	.8703	1.2360	.0000	.0000

SIC	MID	MES	CDR	CAR	MCDR	MESD20
3566	****	****	****	1.0942	****	****
3567	****	****	****	.8210	****	****
3568	.0097	.0329	-.9766	1.1183	.0097	.0329
3573	.0083	.0171	.6586	1.7951	.0083	.0171
3574	****	****	****	1.0061	****	****
3576	.0278	.0450	****	1.3354	.0000	.0000
3585	.0123	.0183	.7442	1.8733	.0123	.0183
3612	.0156	.0348	.8141	1.9996	.0000	.0000
3613	.0093	.0147	.8537	1.2207	.0000	.0000
3621	.0068	.0116	.8034	.9732	.0000	.0000
3622	.0071	.0199	.9515	.9385	.0000	.0000
3623	.0383	.0977	.7045	1.3558	.0383	.0977
3624	.0839	.0840	****	1.2931	.0000	.0000
3629	.0095	.0357	.9241	1.6834	.0000	.0000
3631	.0297	.0555	****	1.3875	.0000	.0000
3632	.1187	.1187	****	1.5467	.0000	.0000
3633	****	****	****	****	****	****
3635	.3610	.1180	****	1.1807	.0000	.0000
3641	.0253	.0307	1.0078	2.6513	.0000	.0000
3651	.0881	.0881	.6041	1.3906	.0881	.0881
3652	.0165	.0441	1.0577	1.5773	.0000	.0000
3674	.0485	.0486	.6433	.7544	.0485	.0486
3691	.0138	.0161	.9235	1.2195	.0000	.0000
3692	.0897	.0896	****	1.4852	.0000	.0000
3694	.1182	.1182	.6028	1.8201	.1182	.1182
3714	.0136	.0136	.8974	.9410	.0000	.0000
3715	.0136	.0198	.9699	.8922	.0000	.0000
3724	.0736	.0736	-1.2298	.9910	.0736	.0736
3792	.0060	.0092	.9244	.9132	.0000	.0000
3843	.0149	.0250	.8892	1.1168	.0000	.0000
3949	.0027	.0058	.8338	.8777	.0000	.0000

SIC	LBCU75	LBCU76	LBCU 7576	LBASS75	LBASS76	LBASS 7576
2026	1.0000	1.0000	1.0000	.3302	3.6690	1.9996
2032	1.0000	1.0000	1.0000	.6947	.7276	.7111
2037	1.0000	1.0000	1.0000	.8204	.7460	.7832
2038	1.0000	1.0000	1.0000	.5606	.5468	.5537

SIC	LBCU75	LBCU76	LBCU 7576	LBASS75	LBASS76	LBASS 7576
2043	1.0000	1.0000	1.0000	.5940	.5870	.5905
2047	1.0000	1.0000	1.0000	.5880	.5919	.5899
2048	1.0000	1.0000	1.0000	.3844	.3656	.3750
2046	1.0000	.9437	1.0000	.7521	.8560	.8040
2051	1.0000	1.0000	1.0000	.4772	.5012	.4892
2052	1.0000	1.0000	1.0000	.5112	.5232	.5172
2063	.8680	.6176	.7428	.6953	.7933	.7443
2065	1.0000	1.0000	1.0000	.6212	.5972	.6092
2066	1.0000	1.0000	1.0000	.5659	.5898	.5778
2067	1.0000	1.0000	1.0000	.8944	****	****
2085	1.0000	1.0000	1.0000	1.7421	1.7183	1.7302
2086	1.0000	1.0000	1.0000	.5961	.6252	.6107
2087	1.0000	.9599	1.0000	.6423	.7234	.6829
2095	1.0000	1.0000	1.0000	.5015	.5070	.5043
2253	.6230	1.0000	.9342	.4978	.7724	.6351
2254	1.0000	1.0000	1.0000	.8764	.8480	.8622
2641	1.0000	1.0000	1.0000	.9871	.9012	.9441
2642	.9618	1.0000	1.0000	.7648	.6491	.7069
2643	.9414	1.0000	1.0000	.6270	.6392	.6331
2647	1.0000	1.0000	1.0000	1.0869	1.0635	1.0752
2648	1.0000	1.0000	1.0000	.5922	.6120	.6021
2813	1.0000	1.0000	1.0000	1.7768	9.8674	5.8221
2816	.9719	1.0000	1.0000	1.6519	1.4399	1.5459
2821	.8795	1.0000	1.0000	2.3637	2.1747	2.2692
2822	.9120	1.0000	1.0000	1.1294	1.1187	1.1240
2844	1.0000	1.0000	1.0000	.6846	.6530	.6688
2879	1.0000	1.0000	1.0000	.9439	1.0839	1.0139
2892	1.0000	.9417	1.0000	.7918	.8326	.8122
3221	1.0000	1.0000	1.0000	.8500	.8972	.8736
3229	1.0000	1.0000	1.0000	1.4083	1.2996	1.3540
3261	.6919	1.0000	1.0000	.7407	.9171	.8289
3264	1.0000	1.0000	1.0000	1.0215	1.2215	1.1215
3273	1.0000	1.0000	1.0000	.6704	.7000	.6852
3274	1.0000	1.0000	1.0000	1.7005	1.4941	1.5973
3275	.8517	1.0000	.9971	1.3523	1.4351	1.3937
3291	.9025	1.0000	1.0000	.9869	1.0010	.9939
3292	.9359	1.0000	1.0000	.8428	.8912	.8670
3296	1.0000	1.0000	1.0000	1.1027	1.0361	1.0694

SIC	LBCU75	LBCU76	LBCU 7576	LBASS75	LBASS76	LBASS 7576
3331	.8190	1.0000	.9635	2.2906	2.7398	2.5152
3332	.8182	1.0000	.9296	.6667	.8336	.7501
3333	.6097	1.0000	.8847	.9724	1.4820	1.2272
3334	.8374	1.0000	1.0000	1.6520	1.5848	1.6184
3339	.8163	1.0000	.9195	1.3018	1.9146	1.6082
3357	.7602	1.0000	.9191	.6846	.8921	.7883
3411	1.0000	1.0000	1.0000	.7047	.6665	.6856
3412	.8358	1.0000	.9384	.6195	.7342	.6768
3421	.9595	1.0000	1.0000	.8126	.8582	.8354
3429	.8972	1.0000	1.0000	.8922	.9325	.9124
3431	.7689	1.0000	1.0000	.6959	.7625	.7292
3432	1.0000	1.0000	1.0000	.8359	.8217	.8288
3433	.6699	1.0000	.8690	.6350	.9028	.7689
3441	1.0000	1.0000	1.0000	****	****	****
3442	.9399	1.0000	1.0000	.7096	.6923	.7010
3443	1.0000	1.0000	1.0000	.9979	.9617	.9798
3465	1.0000	1.0000	1.0000	.7552	.6880	.7216
3466	1.0000	1.0000	1.0000	.7851	.6929	.7390
3469	1.0000	1.0000	1.0000	.9579	.8320	.8949
3494	1.0000	1.0000	1.0000	1.0408	1.0204	1.0306
3511	1.0000	1.0000	1.0000	1.1672	1.0669	1.1171
3519	1.0000	1.0000	1.0000	.8353	.8717	.8535
3523	1.0000	1.0000	1.0000	.6144	.6966	.6555
3524	.9347	1.0000	.9812	.6910	.7477	.7194
3531	1.0000	.9322	1.0000	.8331	.8803	.8567
3532	1.0000	1.0000	1.0000	.7413	.7649	.7531
3533	1.0000	.9822	1.0000	.7309	.9964	.8636
3534	1.0000	.8492	.9527	17.1319	.9547	9.0433
3535	1.0000	1.0000	1.0000	.7185	.7582	.7383
3536	1.0000	.9682	1.0000	.7002	.6992	.6997
3537	.7198	1.0000	.9040	.6702	.9397	.8050
3541	1.0000	.9348	1.0000	.9889	.9895	.9892
3545	1.0000	1.0000	1.0000	.8445	.9026	.8736
3546	.8590	1.0000	1.0000	.8647	.8950	.8798
3551	1.0000	1.0000	1.0000	.8887	.9528	.9207
3552	.9018	.8730	.8874	1.1932	1.2401	1.2167
3553	1.0000	1.0000	1.0000	.9916	.8558	.9237

SIC	LBCU75	LBCU76	LBCU 7576	LBASS75	LBASS76	LBASS 7576
3554	1.0000	1.0000	1.0000	.9651	1.0120	.9885
3555	.8651	.9749	.9200	.9075	1.0231	.9653
3559	1.0000	1.0000	1.0000	10.2794	10.2216	10.2505
3561	1.0000	1.0000	1.0000	.9200	.9303	.9252
3562	1.0000	1.0000	1.0000	1.1952	1.1137	1.1545
3563	1.0000	1.0000	1.0000	.8267	.7710	.7989
3564	1.0000	1.0000	1.0000	.7634	.7643	.7638
3566	1.0000	1.0000	1.0000	.8350	.8726	.8538
3567	.8750	1.0000	.9999	.8975	.8597	.8786
3568	1.0000	.9604	1.0000	.7797	.7781	.7789
3573	1.0000	1.0000	1.0000	1.6701	1.5814	1.6258
3574	.6079	1.0000	.8155	.3396	1.1658	.7527
3576	1.0000	1.0000	1.0000	.7805	56.5102	28.6454
3585	.8137	1.0000	1.0000	.7551	.8129	.7840
3612	.8697	1.0000	.9427	.7128	.8057	.7593
3613	1.0000	1.0000	1.0000	.6688	.6914	.6801
3621	.9381	1.0000	1.0000	.7585	.7786	.7685
3622	.9479	1.0000	1.0000	.6399	.6853	.6626
3623	.9855	.8092	.8973	.6467	.5833	.6150
3624	1.0000	1.0000	1.0000	1.2501	1.3135	1.2818
3629	.6540	1.0000	.8467	.5087	.7123	.6105
3631	.9397	1.0000	1.0000	.6674	.6398	.6536
3632	.9844	1.0000	.9984	.5612	.5556	.5584
3633	.9689	1.0000	1.0000	.5812	.5227	.5519
3635	1.0000	1.0000	1.0000	.6853	.6363	.6608
3641	1.0000	1.0000	1.0000	1.0790	1.0213	1.0502
3651	.9505	1.0000	1.0000	.6417	.6423	.6420
3652	1.0000	1.0000	1.0000	.8587	.8173	.8380
3674	.6420	1.0000	.9170	.7430	.9986	.8708
3691	1.0000	1.0000	1.0000	.9036	10.1526	5.5281
3692	1.0000	1.0000	1.0000	.8396	.7918	.8157
3694	.9884	1.0000	1.0000	.8197	.7871	.8034
3714	.9701	1.0000	1.0000	.7110	.6518	.6814
3715	.5983	1.0000	.9554	.6299	.9237	.7768
3724	1.0000	1.0000	1.0000	.8329	.7651	.7990
3792	1.0000	1.0000	1.0000	.4006	.3883	.3944
3843	.8288	.9926	.9107	.6213	56.8746	28.7480
3949	.9878	1.0000	1.0000	1.0753	1.0722	1.0737

SIC	DeprTo Sales75	DeprTo Sales76	DeprTo Sales7576	LBRD75	LBRD76	LBRD 7576
2026	.0111	.0110	.0110	.0004	****	****
2032	.0161	.0171	.0166	.0059	.0064	.0062
2037	.0201	.0210	.0206	.0052	.0053	.0053
2038	.0176	.0171	.0174	.0035	.0043	.0039
2043	.0147	.0160	.0154	.0071	.0099	.0085
2047	.0165	.0165	.0165	.0083	.0092	.0088
2048	.0104	.0102	.0103	.0074	.0076	.0075
2046	.0211	.0269	.0240	.0070	.0071	.0071
2051	.0215	.0229	.0222	.0061	.0021	.0041
2052	.0150	.0147	.0149	****	.0025	****
2063	.0169	.0291	.0230	.0033	.0046	.0040
2065	.0124	.0129	.0127	.0030	.0028	.0029
2066	.0101	.0091	.0096	.0037	.0041	.0039
2067	.0202	****	****	.0078	****	****
2085	.0180	.0178	.0179	.0021	.0032	.0027
2086	.0235	.0242	.0239	.0007	.0007	.0007
2087	.0145	6.1789	3.0967	.0060	.0061	.0061
2095	.0109	.0087	.0098	.0064	.0067	.0066
2253	.0173	.0138	.0155	****	.0006	****
2254	.0196	.0189	.0193	.0021	.0016	.0019
2641	.0313	.0288	.0301	.0144	.0128	.0136
2642	.0229	.0214	.0221	.0018	.0016	.0017
2643	.0221	.0175	.0198	.0071	.0065	.0068
2647	.0314	.0313	.0313	.0203	.0201	.0202
2648	.0136	.0161	.0149	.0017	.0019	.0018
2813	.0807	.0817	.0812	.0121	.0093	.0107
2816	.0685	.0592	.0639	.0302	.0255	.0278
2821	.0502	.0427	.0464	.0332	.0271	.0302
2822	.0545	.0485	.0515	.0327	.0319	.0323
2844	.0110	.0103	.0106	.0231	.0234	.0232
2879	.0254	.0284	.0269	.0494	.0537	.0516
2892	.0220	.0256	.0238	.0163	.0104	.0133
3221	.0312	.0316	.0314	****	****	****
3229	.0439	.0393	.0416	.0405	.0370	.0387
3261	.0261	.0230	.0245	.0043	.0050	.0047
3264	.0325	.0343	.0334	.0207	.0225	.0216
3273	.0301	.0281	.0291	****	****	****

SIC	DeprTo Sales75	DeprTo Sales76	DeprTo Sales7576	LBRD75	LBRD76	LBRD 7576
3274	.0700	.0661	.0681	.0078	.0067	.0072
3275	.0420	.0350	.0385	.0048	.0055	.0052
3291	.0268	.0284	.0276	.0149	.0151	.0150
3292	.0231	.0240	.0236	.0130	.0120	.0125
3296	.0414	.0365	.0389	.0174	.0130	.0152
3331	.0645	.0571	.0608	.0058	.0051	.0054
3332	.0196	.0209	.0203	.0048	.0055	.0052
3333	.0439	.0384	.0412	.0084	.0062	.0073
3334	.0544	.0450	.0497	.0138	.0112	.0125
3339	.0468	.0421	.0444	.0134	.0155	.0144
3357	.0298	.0275	.0287	.0069	.0073	.0071
3411	.0238	.0227	.0233	.0116	.0109	.0113
3412	.0153	.0151	.0152	.0017	.0011	.0014
3421	.0468	.0441	.0454	****	.0331	****
3429	.0266	.0316	.0291	.0109	.0083	.0096
3431	.0164	.0180	.0172	.0044	.0032	.0038
3432	.0200	.0202	.0201	.0124	.0086	.0105
3433	.0250	.0214	.0232	.0152	.0125	.0139
3441	.0084	.0073	.0079	****	****	****
3442	.0189	.0148	.0168	.0026	.0024	.0025
3443	.0186	.0188	.0187	.0344	.0363	.0354
3465	.0196	.0199	.0198	.0048	.0050	.0049
3466	.0247	.0227	.0237	.0182	.0102	.0142
3469	.0196	.0166	.0181	.0036	.0072	.0054
3494	.0229	.0225	.0227	.0077	.0102	.0089
3511	.0322	.0301	.0311	.0351	.0351	.0351
3519	.0335	.0311	.0323	.0335	.0450	.0393
3523	.0137	.0155	.0146	.0196	.0227	.0212
3524	.0159	.0180	.0169	.0176	.0162	.0169
3531	.0224	.0295	.0260	.0283	.0330	.0306
3532	.0123	.0153	.0138	.0149	.0137	.0143
3533	.0138	.0164	.0151	.0080	.0096	.0088
3534	.0153	.0089	.0121	.0163	.0097	.0130
3535	.0107	.0111	.0109	.0117	.0131	.0124
3536	.0150	.0167	.0159	.0127	.0112	.0119
3537	.0308	.0300	.0304	.0313	.0284	.0299
3541	.0170	.0193	.0181	.0190	.0232	.0211
3545	.0261	.0224	.0242	.0061	.0075	.0068

SIC	DeprTo Sales75	DeprTo Sales76	DeprTo Sales7576	LBRD75	LBRD76	LBRD 7576
3546	.0230	.0218	.0224	.0179	.0175	.0177
3551	.0187	.0202	.0195	.0190	.0179	.0185
3552	.0325	.0375	.0350	.0203	.0151	.0177
3553	.0217	.0243	.0230	.0065	.0211	.0138
3554	.0157	.0167	.0162	.0127	.0126	.0126
3555	.0165	.0202	.0184	.0240	.0283	.0262
3559	.0179	.0178	.0178	.0230	.0189	.0210
3561	.0241	.0248	.0244	.0211	.0218	.0215
3562	.0411	.0412	.0412	.0135	.0124	.0130
3563	.0152	.0158	.0155	.0299	.0160	.0230
3564	.0117	.0114	.0115	.0072	.0092	.0082
3566	.0217	.0265	.0241	.0070	.0078	.0074
3567	.0139	.0127	.0133	.0088	.0116	.0102
3568	.0215	.0273	.0244	.0184	.0203	.0194
3573	.1012	.0887	.0950	.0887	.0851	.0869
3574	.0376	.0420	.0398	.0450	.0697	.0573
3576	.0110	.0134	.0122	.0202	.0258	.0230
3585	.0249	.0193	.0221	.0184	.0166	.0175
3612	.0246	.0250	.0248	.0163	.0147	.0155
3613	.0151	.0134	.0143	.0185	.0229	.0207
3621	.0310	.0223	.0266	.0147	.0129	.0138
3622	.0153	.0161	.0157	.0178	.0215	.0196
3623	.0118	.0160	.0139	.0096	.0121	.0108
3624	.0406	.0407	.0406	.0241	.0270	.0255
3629	.0253	.0226	.0240	.0257	.0211	.0234
3631	.0210	.0171	.0190	.0147	.0125	.0136
3632	.0196	.0206	.0201	.0101	.0101	.0101
3633	.0310	.0222	.0266	.0098	.0091	.0095
3635	.0177	.0180	.0179	.0103	.0099	.0101
3641	.0294	.0300	.0297	****	.0246	****
3651	.0100	.0102	.0101	.0204	.0172	.0188
3652	.0118	.0117	.0117	.0039	.0035	.0037
3674	.0642	.0494	.0568	.0708	.0605	.0657
3691	.0335	.0310	.0322	.0130	.0149	.0139
3692	.0242	.0174	.0208	.0309	.0329	.0319
3694	.0174	.0141	.0158	.0233	.0210	.0222
3714	.0207	.0186	.0197	.0089	.0082	.0086
3715	.0423	.0334	.0379	****	****	****

SIC	DeprTo Sales75	DeprTo Sales76	DeprTo Sales7576	LBRD75	LBRD76	LBRD 7576
3724	.0198	.0183	.0191	.0869	.0791	.0830
3792	.0066	.0065	.0066	.0074	****	****
3843	.0139	.0224	.0182	.0275	.0373	.0324
3949	.0222	.0199	.0211	.0071	.0077	.0074

SIC	Exports ToSales	Imports ToSales	NCO
2026	.0007	-.0005	1516
2032	.0149	-.0042	172
2037	.0316	-.0188	190
2038	.0017	.0000	331
2043	.0111	-.0014	32
2047	.0125	-.0156	218
2048	.0147	-.0023	1439
2046	.1223	-.0117	22
2051	.0052	-.0010	2549
2052	.0000	-.0197	263
2063	.0523	-1.2342	14
2065	.0172	-.0313	865
2066	.0144	-.2872	46
2067	.0155	-.0217	14
2085	.0201	-.3441	64
2086	.0057	-.0009	1757
2087	.0372	-.0139	317
2095	.0187	-.0638	133
2253	****	****	902
2254	****	****	80
2641	.0475	-.0157	454
2642	.0135	-.0006	182
2643	.0071	.0000	461
2647	.0050	.0000	72
2648	.0239	-.0190	221
2813	****	****	109
2816	****	****	71
2821	.0979	-.0117	221
2822	.1681	-.0780	56
2844	.0278	-.0275	644

SIC	Exports ToSales	Imports ToSales	NCO
2879	.1192	-.0413	338
2892	.0534	-.0141	62
3221	.0171	-.0065	31
3229	.2074	-.2087	325
3261	.0338	-.0194	54
3264	.0865	-.0912	77
3273	.0000	.0000	4319
3274	.0060	-.0341	64
3275	.0136	-.0067	60
3291	.0683	-.0744	354
3292	.0713	-.0385	87
3296	.0283	-.0113	95
3331	.0224	-.1363	9
3332	.0054	-.2420	4
3333	.0063	-.9238	8
3334	.0392	-.2624	13
3339	.2653	-1.9271	81
3357	.0472	-.0207	245
3411	.0054	.0000	153
3412	.0363	-.0589	120
3421	.0381	-.1827	119
3429	.0353	-.0338	1063
3431	.0348	.0000	96
3432	.0286	-.0019	191
3433	.0880	-.0476	681
3441	.0251	-.0219	2319
3442	.0156	-.0006	1498
3443	.0570	-.0077	1683
3465	.0812	-.0081	495
3466	.0713	-.0048	42
3469	.0149	-.0141	2544
3494	.1058	-.0575	744
3511	.3239	-.0421	69
3519	.1440	-.0458	186
3523	.1129	-.0943	1864
3524	.0503	-.0556	136
3531	.2457	-.0595	807
3532	.1409	-.0317	293

SIC	Exports ToSales	Imports ToSales	NCO
3533	.2652	.0000	386
3534	.0627	-.0102	134
3535	.0517	-.0193	572
3536	.1378	-.0738	231
3537	.0953	-.0507	450
3541	.0928	-.1691	872
3545	.1071	-.0816	1270
3546	.1110	-.0950	99
3551	.1813	-.1559	686
3552	.1738	-.4460	599
3553	.2170	-.0569	290
3554	.1873	-.1962	193
3555	.2202	-.1201	520
3559	.3544	-.0518	1544
3561	.2721	-.0821	515
3562	.0632	-.1114	102
3563	.4947	-.1493	148
3564	.0406	-.0523	432
3566	.2072	-.1214	307
3567	.2311	-.0387	311
3568	.1558	-.0913	184
3573	.2444	-.0098	802
3574	.0665	-.4314	60
3576	.0982	-.0419	92
3585	.1011	-.0117	725
3612	.0571	-.0523	229
3613	.1074	-.1189	541
3621	.1459	-.0789	340
3622	.0377	-.0086	675
3623	.0994	-.0267	161
3624	.0996	-.0756	58
3629	.1103	-.3081	214
3631	.0436	-.1078	83
3632	.0530	-.0484	33
3633	.0422	-.0033	20
3635	.1005	-.0148	33
3641	.0632	-.0592	128
3651	.0820	-.8066	547

SIC	Exports ToSales	Imports ToSales	NCO
3652	.0520	-.0276	679
3674	.2536	-.2840	502
3691	.0318	-.0205	134
3692	.1082	-.0563	41
3694	.0725	-.0536	372
3714	.1394	-.1215	2196
3715	.0368	.0000	316
3724	.1962	-.0217	226
3792	.0313	.0000	775
3843	.0854	-.0364	507
3949	.0695	-.2623	1757

APPENDIX G: F Comparison

Entry					
1)	CPCM = f(I,Disp,KO,Advr,GROW)				
	KO7576	KOftc7576	2.191352	2.150000	Reject
	KO75	KOftc75	3.403467	2.150000	Reject
	KO76	KOftc76	1.165505	2.150000	Accept
	AdvrToSales	LBADV7576	.432368	2.150000	Accept
	AdvrToSales	LBADV75	.353482	2.150000	Accept
	AdvrToSales	LBADV76	.333018	2.150000	Accept
	KOftc7576	LBADV7576	1.017766	2.600000	Accept
	KOftc75	LBADV75	1.694001	2.600000	Accept
	KOftc76	LBADV76	.383762	2.600000	Accept
2)	LBOPI = f(I,Disp,KO,Advr,GROW)				
	KO7576	KOftc7576	.189756	2.150000	Accept
	KO75	KOftc75	.375316	2.150000	Accept
	KO76	KOftc76	.134196	2.150000	Accept
	AdvrToSales	LBADV7576	.275067	2.150000	Accept
	AdvrToSales	LBADV75	.229245	2.150000	Accept
	AdvrToSales	LBADV76	.355089	2.150000	Accept
	KOftc7576	LBADV7576	.273381	2.600000	Accept
	KOftc75	LBADV75	.207639	2.600000	Accept
	KOftc76	LBADV76	.400633	2.600000	Accept
3)	CPCM = f(I,Disp,KO,Advr,GROW) Case Omitted				
	KO7576	KOftc7576	.801904	2.150000	Accept
	KO75	KOftc75	1.133614	2.150000	Accept
	KO76	KOftc76	.426801	2.150000	Accept
	AdvrToSales	LBADV7576	.485562	2.150000	Accept
	AdvrToSales	LBADV75	.764479	2.150000	Accept
	AdvrToSales	LBADV76	.586210	2.150000	Accept
	KOftc7576	LBADV7576	.665568	2.650000	Accept
	KOftc75	LBADV75	.985397	2.650000	Accept
	KOftc76	LBADV76	.375198	2.650000	Accept
4)	LBOPI = f(I,Disp,KO,Advr,GROW) Case Omitted				
	KO7576	KOftc7576	.109208	2.150000	Accept
	KO75	KOftc75	.292796	2.150000	Accept
	KO76	KOftc76	.059537	2.150000	Accept
	AdvrToSales	LBADV7576	.003591	2.150000	Accept
	AdvrToSales	LBADV75	.027854	2.150000	Accept
	AdvrToSales	LBADV76	.002056	2.150000	Accept
	KOftc7576	LBADV7576	.021808	2.650000	Accept
	KOftc75	LBADV75	.077599	2.650000	Accept
	KOftc76	LBADV76	.044370	2.650000	Accept

Entry					
5)	CPCM = f(I,Disp,KO,Advr,GROW) Standard vs Omitted				
	KO7576	AdvrToSales	.004656	2.600000	Accept
	KO75	AdvrToSales	.162043	2.600000	Accept
	KO76	AdvrToSales	.017097	2.600000	Accept
	KOftc7576	AdvrToSales	.456769	2.600000	Accept
	KOftc75	AdvrToSales	.741632	2.600000	Accept
	KOftc76	AdvrToSales	.103702	2.600000	Accept
	KO7576	LBADV7576	.008244	2.600000	Accept
	KOftc7576	LBADV7576	.679918	2.600000	Accept
	KOftc75	LBADV75	.893070	2.600000	Accept
	KOftc76	LBADV76	.292579	2.600000	Accept
6)	LBOPI = f(I,Disp,KO,Advr,GROW) Standard vs Omitted				
	KO7576	AdvrToSales	.689570	2.600000	Accept
	KO75	AdvrToSales	.624491	2.600000	Accept
	KO76	AdvrToSales	.633964	2.600000	Accept
	KOftc7576	AdvrToSales	.790770	2.600000	Accept
	KOftc75	AdvrToSales	.778565	2.600000	Accept
	KOftc76	AdvrToSales	.666878	2.600000	Accept
	KO7576	LBADV7576	.511808	2.600000	Accept
	KO75	LBADV75	2.130919	2.600000	Accept
	KO76	LBADV76	.511361	2.600000	Accept
	KOftc7576	LBADV7576	.547611	2.600000	Accept
	KOftc75	LBADV75	.522445	2.600000	Accept
	KOftc76	LBADV76	.476740	2.600000	Accept
7)	CPCM = f(I,Disp,KO,Advr,GROW,MCDR)				
	KO7576	KOftc7576	1.593028	3.020000	Accept
	KO75	KOftc75	1.996578	3.020000	Accept
	KO76	KOftc76	1.008425	3.020000	Accept
	AdvrToSales	LBADV7576	.324268	3.020000	Accept
	AdvrToSales	LBADV75	.233303	3.020000	Accept
	AdvrToSales	LBADV76	.281167	3.020000	Accept
	KOftc7576	LBADV7576	.655729	2.650000	Accept
	KOftc75	LBADV75	.771597	2.650000	Accept
	KOftc76	LBADV76	.428305	2.650000	Accept
8)	LBOPI = f(I,Disp,KO,Advr,GROW,MCDR)				
	KO7576	KOftc7576	.038063	3.040000	Accept
	KO75	KOftc75	.078662	3.040000	Accept
	KO76	KOftc76	.039147	3.040000	Accept
	AdvrToSales	LBADV7576	.164415	3.040000	Accept
	AdvrToSales	LBADV75	.145609	3.040000	Accept
	AdvrToSales	LBADV76	.215712	3.040000	Accept
	KOftc7576	LBADV7576	.150388	2.650000	Accept
	KOftc75	LBADV75	.066544	2.650000	Accept
	KOftc76	LBADV76	.299719	2.650000	Accept

Entry

9) CPCM = f(I,Disp,KO,Advr,GROW,MCDR) Case Omitted

KO7576	KOftc7576	.322270	3.040000	Accept
KO75	KOftc75	.345727	3.040000	Accept
KO76	KOftc76	.221461	3.040000	Accept
AdvrToSales	LBADV7576	.346571	3.040000	Accept
AdvrToSales	LBADV75	.694973	3.040000	Accept
AdvrToSales	LBADV76	.378092	3.040000	Accept
KO7576	LBAD7576	.443587	2.650000	Accept
KO75	LBADV75	.518952	2.650000	Accept
KO76	LBADV76	.449138	2.650000	Accept

10) LBOPI = f(I,Disp,KO,Advr,GROW,MCDR) Case Omitted

KO7576	KOftc7576	.010903	3.040000	Accept
KO75	KOftc75	.064597	3.040000	Accept
KO76	KOftc76	.012121	3.040000	Accept
AdvrToSales	LBADV7576	.033829	3.040000	Accept
AdvrToSales	LBADV75	.053947	3.040000	Accept
AdvrToSales	LBADV76	.018470	3.040000	Accept
KOftc7576	LBADV7576	.052708	2.650000	Accept
KOftc75	LBADV75	.050887	2.650000	Accept
KOftc76	LBADV76	.101456	2.650000	Accept

11) CPCM = F(I,Disp,KO,Advr,GROW,MCDR) Standard vs Omitted

KO7576	AdvrToSales	.008512	2.650000	Accept
KO75	AdvrToSales	.226016	2.650000	Accept
KO76	AdvrToSales	.004026	2.650000	Accept
KOftc7576	AdvrToSales	.639885	2.650000	Accept
KOftc75	AdvrToSales	.835537	2.650000	Accept
KOftc76	AdvrToSales	.371221	2.650000	Accept
KO7576	LBADV7576	.008702	2.650000	Accept
KO75	LBADV75	.901034	2.650000	Accept
KO76	LBADV76	.016246	2.650000	Accept
KOftc7576	LBADV7576	.944712	2.650000	Accept
KOftc75	LBADV75	1.049174	2.650000	Accept
KOftc76	LBADV76	.738940	2.650000	Accept

12) LBOPI = f(I,Disp,KO,Advr,GROW,MCDR) Standard vs Omitted

KO7576	AdvrToSales	.905707	2.650000	Accept
KO75	AdvrToSales	.822496	2.650000	Accept
KO76	AdvrToSales	.849722	2.650000	Accept
KOftc7576	AdvrToSales	.958071	2.650000	Accept
KOftc75	AdvrToSales	.890220	2.650000	Accept
KOftc76	AdvrToSales	.877450	2.650000	Accept
KO7576	LBADV7576	.542851	2.650000	Accept
KO75	LBADV75	2.074140	2.650000	Accept
KO76	LBADV76	.295820	2.650000	Accept

12) LBOPI = f(I,Disp,KO,Advr,GROW,MCDR) Standard vs Omitted con't

KOftc7576	LBADV7576	.565335	2.650000	Accept
KOftc75	LBADV75	.544402	2.650000	Accept
KOftc76	LBADV76	.503750	2.650000	Accept

Entry

13) CPCM = f(I,Disp,KO,Advr,GROW,CAR)

KO7576	KOftc7576	2.457033	3.040000	Accept
KO75	KOftc75	3.822440	3.040000	Reject
KO76	KOftc76	1.321996	3.040000	Accept
AdvrToSales	LBADV7576	.226115	3.040000	Accept
AdvrToSales	LBADV75	.195917	3.040000	Accept
AdvrToSales	LBADV76	.200878	3.040000	Accept
KOftc7576	LBADV7576	.900350	2.650000	Accept
KOftc75	LBADV75	1.696668	2.650000	Accept
KOftc76	LBADV76	.308285	2.650000	Accept

14) LBOPI = f(I,Disp,KO,Advr,GROW,CAR)

KO7576	KOftc7576	.389720	3.040000	Accept
KO75	KOftc75	.575171	3.040000	Accept
KO76	KOftc76	.290581	3.040000	Accept
AdvrToSales	LBADV7576	.254163	3.040000	Accept
AdvrToSales	LBADV75	.197006	3.040000	Accept
AdvrToSales	LBADV76	.353469	3.040000	Accept
KOftc7576	LBADV7576	.298018	2.650000	Accept
KOftc75	LBADV75	.265708	2.650000	Accept
KOftc76	LBADV76	.346037	2.650000	Accept

15) CPCM = f(I,Disp,KO,Advr,GROW,CAR) Case Omitted

KO7576	KOftc7576	.734160	3.040000	Accept
KO75	KOftc75	1.260528	3.040000	Accept
KO76	KOftc76	1.912682	3.040000	Accept
AdvrToSales	LBADV7576	.153867	3.040000	Accept
AdvrToSales	LBADV75	.142779	3.040000	Accept
AdvrToSales	LBADV76	.210117	3.040000	Accept
KOftc7576	LBADV7576	.467965	2.650000	Accept
KOftc75	LBADV75	.811173	2.650000	Accept
KOftc76	LBADV76	.683030	2.650000	Accept

16) LBOPI = f(I,Disp,KO,Advr,GROW,CAR) Case Omitted

KO7576	KOftc7576	.282374	3.040000	Accept
KO75	KOftc75	.476277	3.040000	Accept
KO76	KOftc76	.182799	3.040000	Accept
AdvrToSales	LBADV7576	.006853	3.040000	Accept
AdvrToSales	LBADV75	.007528	3.040000	Accept
AdvrToSales	LBADV76	.030881	3.040000	Accept

16) LBOPI = f(I,Disp,KO,Advr,GROW,CAR) Case Omitted con't

KOftc7576	LBADV7576	.112940	2.650000	Accept
KOftc75	LBADV75	.177652	2.650000	Accept
KOftc76	LBADV76	.054377	2.650000	Accept

Entry

17) CPCM = f(I,Disp,KO,Advr,GROW,CAR) Standard vs Omitted

KO7576	AdvrToSales	.021885	2.650000	Accept
KO75	AdvrToSales	.033472	2.650000	Accept
KO76	AdvrToSales	.215939	2.650000	Accept
KOftc7576	AdvrToSales	.755141	2.650000	Accept
KOftc75	AdvrToSales	1.251736	2.650000	Accept
KOftc76	AdvrToSales	.191365	2.650000	Accept
KO7576	LBADV7576	.028282	2.650000	Accept
KO76	LBADV76	.178723	2.650000	Accept
KOftc7576	LBADV7576	.915439	2.650000	Accept
KOftc75	LBADV75	1.273066	2.650000	Accept
KOftc76	LBADV76	.384787	2.650000	Accept

18) LBOPI = f(I,Disp,KO,Advr,GROW,CAR) Standard vs Omitted

KO7576	AdvrToSales	.008123	2.650000	Accept
KO75	AdvrToSales	.013499	2.650000	Accept
KO76	AdvrToSales	.092443	2.650000	Accept
KOftc7576	AdvrToSales	.206461	2.650000	Accept
KOftc75	AdvrToSales	.262403	2.650000	Accept
KOftc76	AdvrToSales	.071747	2.650000	Accept
KO7576	LBADV7576	.014183	2.650000	Accept
KO75	LBADV75	.978618	2.650000	Accept
KO76	LBADV76	.108945	2.650000	Accept
KOftc7576	LBADV7576	.306581	2.650000	Accept
KOftc75	LBADV75	.297388	2.650000	Accept
KOftc76	LBADV76	.174032	2.650000	Accept

19) CPCM = f(I,Disp,KO,Advr,GROW,LBRD)

KO7576	KOftc7576	1.942705	3.040000	Accept
KO75	KOftc75	3.361706	3.040000	Reject
KO76	KOftc76	.778925	3.040000	Accept
AdvrToSales	LBADV7576	.326012	3.040000	Accept
AdvrToSales	LBADV75	.274590	3.040000	Accept
AdvrToSales	LBADV76	.290601	3.040000	Accept
KOftc7576	LBADV7576	.725706	2.650000	Accept
KOftc75	LBADV75	1.520958	2.650000	Accept
KOftc76	LBADV76	.193050	2.650000	Accept

20) LBOPI = f(I,Disp,KO,Advr,GROW,LBRD)

KO7576	KOftc7576	.143221	3.040000	Accept
KO75	KOftc75	.406417	3.040000	Accept
KO76	KOftc76	.107929	3.040000	Accept

20) LBOPI = f(I,Disp,KO,Advr,GROW,LBRD) con't

AdvrToSales	LBADV7576	.009891	3.040000	Accept
AdvrToSales	LBADV75	.033021	3.040000	Accept
AdvrToSales	LBADV76	.328775	3.040000	Accept
KOftc7576	LBADV7576	.028367	2.650000	Accept
KOftc75	LBADV75	.139323	2.650000	Accept
KOftc76	LBADV76	.366836	2.650000	Accept

Entry

21) CPCM = f(I,Disp,KO,Advr,GROW,LBRD) Case Omitted

KO7576	KOftc7576	.782766	3.040000	Accept
KO75	KOftc75	1.294579	3.040000	Accept
KO76	KOftc76	.814752	3.040000	Accept
AdvrToSales	LBADV7576	.384125	3.040000	Accept
AdvrToSales	LBADV75	.333887	3.040000	Accept
AdvrToSales	LBADV76	.384737	3.040000	Accept
KOftc7576	LBADV7576	.419571	2.650000	Accept
KOftc75	LBADV75	.699094	2.650000	Accept
KOftc76	LBADV76	.209966	2.650000	Accept

22) LBOPI = f(I,Disp,KO,Advr,GROW,LBRD) Case Omitted

KO7576	KOftc7576	.372462	3.040000	Accept
KO75	KOftc75	.742042	3.040000	Accept
KO76	KOftc76	.042050	3.040000	Accept
AdvrToSales	LBADV7576	.008294	3.040000	Accept
AdvrToSales	LBADV75	.028329	3.040000	Accept
AdvrToSales	LBADV76	.000164	3.040000	Accept
KOftc7576	LBADV7576	.115353	2.650000	Accept
KOftc75	LBADV75	.028256	2.650000	Accept
KOftc76	LBADV76	.023137	2.650000	Accept

23) CPCM = f(I,Disp,KO,Advr,GROW,LBRD) Standard vs Omitted

KO7576	AdvrToSales	.007100	2.650000	Accept
KO75	AdvrToSales	.007855	2.650000	Accept
KO76	AdvrToSales	.017129	2.650000	Accept
KOftc7576	AdvrToSales	.358655	2.650000	Accept
KOftc75	AdvrToSales	.681288	2.650000	Accept
KOftc76	AdvrToSales	.017080	2.650000	Accept
KO7576	LBADV7576	.014335	2.650000	Accept
KO75	LBADV75	1.598835	2.650000	Accept
KO76	LBADV76	.024236	2.650000	Accept
KOftc7576	LBADV7576	.578937	2.650000	Accept
KOftc75	LBADV75	.821268	2.650000	Accept
KOftc76	LBADV76	.024458	2.650000	Accept

24) LBOPI = f(I,Disp,KO,Advr,GROW,LBRD) Standard vs Omitted

KO7576	AdvrToSales	.011544	2.650000	Accept
KO75	AdvrToSales	.009158	2.650000	Accept
KO76	AdvrToSales	.744029	2.650000	Accept
KOftc7576	AdvrToSales	.020818	2.650000	Accept
KOftc75	AdvrToSales	.021325	2.650000	Accept
KOftc76	AdvrToSales	.778682	2.650000	Accept
KO7576	LBADV7576	.012593	2.650000	Accept
KO75	LBADV75	1.425521	2.650000	Accept
KO76	LBADV76	.634322	2.650000	Accept
KOftc7576	LBADV7576	.015465	2.650000	Accept
KOftc75	LBADV75	.139118	2.650000	Accept
KOftc76	LBADV76	.551939	2.650000	Accept

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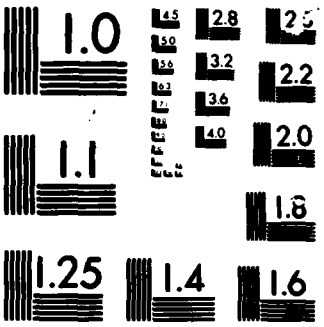

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Vita

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